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# Platform™ LSF™ Command Reference

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# bacct

displays accounting statistics about finished jobs

## Synopsis

```
bacct [-b | -l] [-d] [-e] [-w] [-x] [-app application_profile_name]
      [-C time0,time1] [-D time0,time1] [-f logfile_name]
      [-Lp ls_project_name ...] [-m host_name ...] [-M host_list_file]
      [-N host_name | -N host_model | -N cpu_factor]
      [-P project_name ...] [-q queue_name ...]
      [-sla service_class_name ...] [-S time0,time1]
      [-u user_name ... | -u all] [job_ID ...]
bacct -U reservation_ID ... | -U all [-u user_name ... | -u all]
bacct [-h | -V]
```

## Description

By default, displays accounting statistics for all finished jobs (with a DONE or EXIT status) submitted by the user who invoked the command, on all hosts, projects, and queues in the LSF system.

By default, `bacct` displays statistics for all jobs logged in the current LSF accounting log file: `LSB_SHAREDIR/cluster_name/logdir/lsb.acct`.

By default, CPU time is not normalized.

If neither `-l` nor `-b` is present, displays the fields in SUMMARY only.

Statistics not reported by `bacct` but of interest to individual system administrators can be generated by directly using `awk` or `perl` to process the `lsb.acct` file.

All times are in seconds.

## Throughput Calculation

The throughput (T) of the LSF system, certain hosts, or certain queues is calculated by the formula:

$$T = N / (ET - BT)$$

where:

- ◆ N is the total number of jobs for which accounting statistics are reported
- ◆ BT is the Start time—when the first job was logged
- ◆ ET is the End time—when the last job was logged

You can use the option `-C time0,time1` to specify the Start time as `time0` and the End time as `time1`. In this way, you can examine throughput during a specific time period.

Jobs involved in the throughput calculation are only those being logged (that is, with a DONE or EXIT status). Jobs that are running, suspended, or that have never been dispatched after submission are not considered, because they are still in the LSF system and not logged in `lsb.acct`.

## Options

The total throughput of the LSF system can be calculated by specifying `-u all` without any of the `-m`, `-q`, `-S`, `-D` or `job_ID` options. The throughput of certain hosts can be calculated by specifying `-u all` without the `-q`, `-S`, `-D` or `job_ID` options. The throughput of certain queues can be calculated by specifying `-u all` without the `-m`, `-S`, `-D` or `job_ID` options.

`bacct` does not show local pending batch jobs killed using `bkill -b`. `bacct` shows MultiCluster jobs and local running jobs even if they are killed using `bkill -b`.

## Options

- b** Brief format. Displays accounting statistics in brief format. See [Output](#) for a description of information that is displayed.
- d** Displays accounting statistics for successfully completed jobs (with a DONE status).
- e** Displays accounting statistics for exited jobs (with an EXIT status).
- l** Long format. Displays additional accounting statistics. See [Output](#) for a description of information that is displayed.
- w** Wide format. Displays accounting statistics in a wide format without truncating the fields.
- x** Displays jobs that have triggered a job exception (overrun, underrun, idle). Use with the `-l` option to show the exception status for individual jobs.

### **-app *application\_profile\_name***

Displays accounting information about jobs submitted to the specified application profile. You must specify an existing application profile configured in `lsb.applications`.

- C *time0,time1*** Displays accounting statistics for jobs that completed or exited during the specified time interval. Reads `lsb.acct` and all archived log files (`lsb.acct.n`) unless `-f` is also used.

The time format is the same as in `bhist(1)`.

- D *time0,time1*** Displays accounting statistics for jobs dispatched during the specified time interval. Reads `lsb.acct` and all archived log files (`lsb.acct.n`) unless `-f` is also used.

The time format is the same as in `bhist(1)`.

- f *logfile\_name*** Searches the specified job log file for accounting statistics. Specify either an absolute or relative path.

Useful for offline analysis.

The specified file path can contain up to 4094 characters for UNIX, or up to 255 characters for Windows.

- Lp *ls\_project\_name ...*** Displays accounting statistics for jobs belonging to the specified License Scheduler projects. If a list of projects is specified, project names must be separated by spaces and enclosed in quotation marks (") or (').

- M *host\_list\_file*** Displays accounting statistics for jobs dispatched to the hosts listed in a file (*host\_list\_file*) containing a list of hosts. The host list file has the following format:

- ◆ Multiple lines are supported

- ◆ Each line includes a list of hosts separated by spaces
- ◆ The length of each line must be less than 512 characters

If you also specify a host list in a file with `-m host_name ...`, the last option specified takes effect.

**-m host\_name ...** Displays accounting statistics for jobs dispatched to the specified hosts.

If a list of hosts is specified, host names must be separated by spaces and enclosed in quotation marks (") or (').

If you also specify a host list in a file with `-M host_list_file`, the last option specified takes effect.

**-N host\_name | -N host\_model | -N cpu\_factor**

Normalizes CPU time by the CPU factor of the specified host or host model, or by the specified CPU factor.

If you use `bacct` offline by indicating a job log file, you must specify a CPU factor.

Use `lsinfo` to get host model and CPU factor information.

**-P project\_name ...** Displays accounting statistics for jobs belonging to the specified projects. If a list of projects is specified, project names must be separated by spaces and enclosed in quotation marks (") or (').

**-q queue\_name ...** Displays accounting statistics for jobs submitted to the specified queues.

If a list of queues is specified, queue names must be separated by spaces and enclosed in quotation marks (") or (').

**-S time0,time1** Displays accounting statistics for jobs submitted during the specified time interval. Reads `lsb.acct` and all archived log files (`lsb.acct.n`) unless `-f` is also used.

The time format is the same as in `bhist(1)`.

**-sla service\_class\_name**

Displays accounting statistics for jobs that ran under the specified service class.

Run `bsla` to display the properties of service classes configured in `LSB_CONFDIR/cluster_name/configdir/lsb.serviceclasses` and dynamic information about the state of each service class.

If a default system service class is configured with `ENABLE_DEFAULT_EGO_SLA` in `lsb.params` but not explicitly configured in `lsb.applications`, `bacct -sla service_class_name` displays accounting information for the specified default service class.

**-U reservation\_id ... | -U all**

Displays accounting statistics for the specified advance reservation IDs, or for all reservation IDs if the keyword `all` is specified.

A list of reservation IDs must be separated by spaces and enclosed in quotation marks (") or (').

When combined with the `-U` option, `-u` is interpreted as the user name of the reservation creator. For example:

```
bacct -U all -u user2
```

shows all the advance reservations created by user `user2`.

## Output

Without the `-u` option, `bacct -U` shows all advance reservation information about jobs submitted by the user.

In a MultiCluster environment, advance reservation information is only logged in the execution cluster, so `bacct` displays advance reservation information for local reservations only. You cannot see information about remote reservations. You cannot specify a remote reservation ID, and the keyword `all` only displays information about reservations in the local cluster.

**-u *user\_name ...*|-u all** Displays accounting statistics for jobs submitted by the specified users, or by all users if the keyword `all` is specified.

If a list of users is specified, user names must be separated by spaces and enclosed in quotation marks (") or ('). You can specify both user names and user IDs in the list of users.

***job\_ID ...*** Displays accounting statistics for jobs with the specified job IDs.

This option overrides all other options except `-b`, `-l`, `-f`, `-h`, and `-V`. If the reserved job ID 0 is used, it will be ignored.

**-h** Prints command usage to `stderr` and exits.

**-V** Prints LSF release version to `stderr` and exits.

## Output

### Summary (default format)

Statistics on jobs. The following fields are displayed:

- ◆ Total number of done jobs
- ◆ Total number of exited jobs
- ◆ Total CPU time consumed
- ◆ Average CPU time consumed
- ◆ Maximum CPU time of a job
- ◆ Minimum CPU time of a job
- ◆ Total wait time in queues
- ◆ Average wait time in queue
- ◆ Maximum wait time in queue
- ◆ Minimum wait time in queue
- ◆ Average turnaround time (seconds/job)
- ◆ Maximum turnaround time
- ◆ Minimum turnaround time
- ◆ Average hog factor of a job (cpu time/turnaround time)
- ◆ Maximum hog factor of a job
- ◆ Minimum hog factor of a job
- ◆ Total throughput
- ◆ Beginning time: the completion or exit time of the first job selected
- ◆ Ending time: the completion or exit time of the last job selected

The total, average, minimum, and maximum statistics are on all specified jobs.  
The wait time is the elapsed time from job submission to job dispatch.  
The turnaround time is the elapsed time from job submission to job completion.  
The hog factor is the amount of CPU time consumed by a job divided by its turnaround time.  
The throughput is the number of completed jobs divided by the time period to finish these jobs (jobs/hour).

## Brief Format (-b)

In addition to the default format SUMMARY, displays the following fields:

U/UID	Name of the user who submitted the job. If LSF fails to get the user name by <code>getpwuid(3)</code> , the user ID is displayed.
QUEUE	Queue to which the job was submitted.
SUBMIT_TIME	Time when the job was submitted.
CPU_T	CPU time consumed by the job.
WAIT	Wait time of the job.
TURNAROUND	Turnaround time of the job.
FROM	Host from which the job was submitted.
EXEC_ON	Host or hosts to which the job was dispatched to run.
JOB_NAME	The job name assigned by the user, or the command string assigned by default at job submission with <code>bsub</code> . If the job name is too long to fit in this field, then only the latter part of the job name is displayed.  The displayed job name or job command can contain up to 4094 characters for UNIX, or up to 255 characters for Windows.

## Long Format (-l)

In addition to the fields displayed by default in SUMMARY and by `-b`, displays the following fields:

JOBID	Identifier that LSF assigned to the job.
PROJECT_NAME	Project name assigned to the job.
STATUS	Status that indicates the job was either successfully completed (DONE) or exited (EXIT).
DISPAT_TIME	Time when the job was dispatched to run on the execution hosts.
COMPL_TIME	Time when the job exited or completed.
HOG_FACTOR	Average hog factor, equal to "CPU time" / "turnaround time".

## Output

<b>MEM</b>	Maximum resident memory usage of all processes in a job. By default, memory usage is shown in MB. Use <code>LSF_UNIT_FOR_LIMITS</code> in <code>lsf.conf</code> to specify a larger unit for display (MB, GB, TB, PB, or EB).
<b>SWAP</b>	Maximum virtual memory usage of all processes in a job. By default, swap space is shown in MB. Use <code>LSF_UNIT_FOR_LIMITS</code> in <code>lsf.conf</code> to specify a larger unit for display (MB, GB, TB, PB, or EB).
<b>CWD</b>	Current working directory of the job.
<b>INPUT_FILE</b>	File from which the job reads its standard input (see <code>bsub -i input_file</code> ).
<b>OUTPUT_FILE</b>	File to which the job writes its standard output (see <code>bsub -o output_file</code> ).
<b>ERR_FILE</b>	File in which the job stores its standard error output (see <code>bsub -e err_file</code> ).
<b>EXCEPTION STATUS</b>	Possible values for the exception status of a job include: <b>idle</b> The job is consuming less CPU time than expected. The job idle factor (CPU time/runtime) is less than the configured <code>JOB_IDLE</code> threshold for the queue and a job exception has been triggered. <b>overrun</b> The job is running longer than the number of minutes specified by the <code>JOB_OVERRUN</code> threshold for the queue and a job exception has been triggered. <b>underrun</b> The job finished sooner than the number of minutes specified by the <code>JOB_UNDERRUN</code> threshold for the queue and a job exception has been triggered.

## Advance Reservations (-U)

	Displays the following fields:
<b>RSVID</b>	Advance reservation ID assigned by <code>brsvadd</code> command
<b>TYPE</b>	Type of reservation: user or system
<b>CREATOR</b>	User name of the advance reservation creator, who submitted the <code>brsvadd</code> command
<b>USER</b>	User name of the advance reservation user, who submitted the job with <code>bsub -U</code>
<b>NCPUS</b>	Number of CPUs reserved
<b>RSV_HOSTS</b>	List of hosts for which processors are reserved, and the number of processors reserved
<b>TIME_WINDOW</b>	Time window for the reservation.

- ◆ A one-time reservation displays fields separated by slashes (month/day/hour/minute). For example:

```
11/12/14/0-11/12/18/0
```

- ◆ A recurring reservation displays fields separated by colons (day:hour:minute). For example:

```
5:18:0 5:20:0
```

## Termination reasons displayed by bacct

When LSF detects that a job is terminated, `bacct -l` displays one of the following termination reasons. The corresponding integer value logged to the `JOB_FINISH` record in `lsb.acct` is given in parentheses.

- ◆ `TERM_ADMIN`: Job killed by root or LSF administrator (15)
- ◆ `TERM_BUCKET_KILL`: Job killed with `bkill -b` (23)
- ◆ `TERM_CHKPNT`: Job killed after checkpointing (13)
- ◆ `TERM_CWD_NOTEXIST`: current working directory is not accessible or does not exist on the execution host (25)
- ◆ `TERM_CPULIMIT`: Job killed after reaching LSF CPU usage limit (12)
- ◆ `TERM_DEADLINE`: Job killed after deadline expires (6)
- ◆ `TERM_EXTERNAL_SIGNAL`: Job killed by a signal external to LSF (17)
- ◆ `TERM_FORCE_ADMIN`: Job killed by root or LSF administrator without time for cleanup (9)
- ◆ `TERM_FORCE_OWNER`: Job killed by owner without time for cleanup (8)
- ◆ `TERM_LOAD`: Job killed after load exceeds threshold (3)
- ◆ `TERM_MEMLIMIT`: Job killed after reaching LSF memory usage limit (16)
- ◆ `TERM_OWNER`: Job killed by owner (14)
- ◆ `TERM_PREEMPT`: Job killed after preemption (1)
- ◆ `TERM_PROCESSLIMIT`: Job killed after reaching LSF process limit (7)
- ◆ `TERM_QUEUE_ADMIN`: Job killed and requeued by root or LSF administrator (11)
- ◆ `TERM_QUEUE_OWNER`: Job killed and requeued by owner (10)
- ◆ `TERM_RUNLIMIT`: Job killed after reaching LSF run time limit (5)
- ◆ `TERM_SLURM`: Job terminated abnormally in SLURM (node failure) (22)
- ◆ `TERM_SWAP`: Job killed after reaching LSF swap usage limit (20)
- ◆ `TERM_THREADLIMIT`: Job killed after reaching LSF thread limit (21)
- ◆ `TERM_UNKNOWN`: LSF cannot determine a termination reason—0 is logged but `TERM_UNKNOWN` is not displayed (0)
- ◆ `TERM_WINDOW`: Job killed after queue run window closed (2)

## Output

- ◆ TERM\_ZOMBIE: Job exited while LSF is not available (19)

---

**TIP:** The integer values logged to the JOB\_FINISH record in `lsb.acct` and termination reason keywords are mapped in `lsbatch.h`.

---

# Examples

## Default format

bacct

Accounting information about jobs that are:

- submitted by users user1.
- accounted on all projects.
- completed normally or exited.
- executed on all hosts.
- submitted to all queues.
- accounted on all service classes.

```
-----
SUMMARY:      ( time unit: second )
Total number of done jobs:      60      Total number of exited jobs:  118
Total CPU time consumed:    1011.5      Average CPU time consumed:    5.7
Maximum CPU time of a job:    991.4      Minimum CPU time of a job:    0.0
Total wait time in queues: 134598.0
Average wait time in queue:  756.2
Maximum wait time in queue: 7069.0      Minimum wait time in queue:   0.0
Average turnaround time:      3585 (seconds/job)
Maximum turnaround time:      77524      Minimum turnaround time:      6
Average hog factor of a job:  0.00 ( cpu time / turnaround time )
Maximum hog factor of a job:  0.56      Minimum hog factor of a job:  0.00
Total throughput:              0.67 (jobs/hour) during 266.18 hours
Beginning time:                Aug  8 15:48      Ending time:                  Aug 19 17:59
```

## Jobs that have triggered job exceptions

bacct -x -l

Accounting information about jobs that are:

- submitted by users user1,
- accounted on all projects.
- completed normally or exited
- executed on all hosts.
- submitted to all queues.
- accounted on all service classes.

```
-----
Job <1743>, User <user1>, Project <default>, Status <DONE>, Queue <normal>, Command
      <sleep 30>
Mon Aug 11 18:16:17: Submitted from host <hostB>, CWD <${HOME}/jobs>, Output File
      </dev/null>;
Mon Aug 11 18:17:22: Dispatched to <hostC>;
Mon Aug 11 18:18:54: Completed <done>.
```

EXCEPTION STATUS: underrun

Accounting information about this job:

CPU_T	WAIT	TURNAROUND	STATUS	HOG_FACTOR	MEM	SWAP
0.19	65	157	done	0.0012	4M	5M

```
-----
Job <1948>, User <user1>, Project <default>, Status <DONE>, Queue <normal>,
Command
      <sleep 550>
```

## Examples

```
Tue Aug 12 14:15:03: Submitted from host <hostB>, CWD <${HOME}/jobs>, Output File
</dev/null>;
Tue Aug 12 14:15:15: Dispatched to <hostC>;
Tue Aug 12 14:25:08: Completed <done>.
```

EXCEPTION STATUS: overrun idle

Accounting information about this job:

CPU_T	WAIT	TURNAROUND	STATUS	HOG_FACTOR	MEM	SWAP
0.20	12	605	done	0.0003	4M	5M

---

Job <1949>, User <user1>, Project <default>, Status <DONE>, Queue <normal>, Command

<sleep 400>

```
Tue Aug 12 14:26:11: Submitted from host <hostB>, CWD <${HOME}/jobs>, Output File
</dev/null>;
Tue Aug 12 14:26:18: Dispatched to <hostC>;
Tue Aug 12 14:33:16: Completed <done>.
```

EXCEPTION STATUS: idle

Accounting information about this job:

CPU_T	WAIT	TURNAROUND	STATUS	HOG_FACTOR	MEM	SWAP
0.17	7	425	done	0.0004	4M	5M

Job <719[14]>, Job Name <test[14]>, User <user1>, Project <default>, Status <EXIT>, Queue <normal>, Command </home/user1/job1>

```
Mon Aug 18 20:27:44: Submitted from host <hostB>, CWD <${HOME}/jobs>, Output File
</dev/null>;
Mon Aug 18 20:31:16: [14] dispatched to <hostA>;
Mon Aug 18 20:31:18: Completed <exit>.
```

EXCEPTION STATUS: underrun

Accounting information about this job:

CPU_T	WAIT	TURNAROUND	STATUS	HOG_FACTOR	MEM	SWAP
0.19	212	214	exit	0.0009	2M	4M

---

SUMMARY: ( time unit: second )

Total number of done jobs:	45	Total number of exited jobs:	56
Total CPU time consumed:	1009.1	Average CPU time consumed:	10.0
Maximum CPU time of a job:	991.4	Minimum CPU time of a job:	0.1
Total wait time in queues:	116864.0		
Average wait time in queue:	1157.1		
Maximum wait time in queue:	7069.0	Minimum wait time in queue:	7.0
Average turnaround time:	1317 (seconds/job)		
Maximum turnaround time:	7070	Minimum turnaround time:	10
Average hog factor of a job:	0.01 ( cpu time / turnaround time )		
Maximum hog factor of a job:	0.56	Minimum hog factor of a job:	0.00
Total throughput:	0.59 (jobs/hour) during 170.21 hours		
Beginning time:	Aug 11 18:18	Ending time:	Aug 18 20:31

## Advance reservation accounting information

```
bacct -U user1#2
```

```
Accounting for:
```

- advanced reservation IDs: user1#2
- advanced reservations created by user1

```
-----  
RSVID      TYPE      CREATOR   USER      NCPUS      RSV_HOSTS  TIME_WINDOW  
user1#2    user      user1     user1     1          hostA:1    9/16/17/36-9/16/17/38
```

```
SUMMARY:
```

```
Total number of jobs:          4  
Total CPU time consumed:      0.5 second  
Maximum memory of a job:      4.2 MB  
Maximum swap of a job:        5.2 MB  
Total duration time:          0 hour   2 minute   0 second
```

## LSF Job termination reason logging

When a job finishes, LSF reports the last job termination action it took against the job and logs it into `lsb.acct`.

If a running job exits because of node failure, LSF sets the correct exit information in `lsb.acct`, `lsb.events`, and the job output file.

Use `bacct -l` to view job exit information logged to `lsb.acct`:

```
bacct -l 7265
```

```
Accounting information about jobs that are:
```

- submitted by all users.
- accounted on all projects.
- completed normally or exited
- executed on all hosts.
- submitted to all queues.
- accounted on all service classes.

```
-----  
Job <7265>, User <lsfadmin>, Project <default>, Status <EXIT>, Queue <normal>,  
      Command <srunk sleep 100000>  
Thu Sep 16 15:22:09: Submitted from host <hostA>, CWD <${HOME}>;  
Thu Sep 16 15:22:20: Dispatched to 4 Hosts/Processors <4*hostA>;  
Thu Sep 16 15:22:20: slurm_id=21793;ncpus=4;slurm_alloc=n[13-14];  
Thu Sep 16 15:23:21: Completed <exit>; TERM_RUNLIMIT: job killed after reaching  
      LSF run time limit.
```

```
Accounting information about this job:
```

```
Share group charged </lsfadmin>
```

```
CPU_T      WAIT      TURNAROUND  STATUS      HOG_FACTOR  MEM      SWAP  
0.04       11          72         exit        0.0006     OK       OK
```

## Files

```
SUMMARY:      ( time unit: second )
Total number of done jobs:      0      Total number of exited jobs:      1
Total CPU time consumed:      0.0      Average CPU time consumed:      0.0
Maximum CPU time of a job:      0.0      Minimum CPU time of a job:      0.0
Total wait time in queues:      11.0
Average wait time in queue:      11.0
Maximum wait time in queue:      11.0      Minimum wait time in queue:      11.0
Average turnaround time:      72 (seconds/job)
Maximum turnaround time:      72      Minimum turnaround time:      72
Average hog factor of a job:      0.00 ( cpu time / turnaround time )
Maximum hog factor of a job:      0.00      Minimum hog factor of a job:      0.00
```

## Files

Reads `lsb.acct`, `lsb.acct.n`.

## See Also

[bhist](#), [bsub](#), [bjobs](#), `lsb.acct`, [brsvadd](#), [brsvs](#), [bsla](#), `lsb.serviceclasses`

# bapp

displays information about application profile configuration

## Synopsis

```
bapp [-l | -w] [application_profile_name ...]
```

```
bapp [-h | -V]
```

## Description

Displays information about application profiles configured in `lsb.applications`.

By default, returns the following information about all application profiles: application name, job slot statistics, and job state statistics.

In MultiCluster, returns the information about all application profiles in the local cluster.

Application profile names and attributes are set up by the LSF administrator.

See `lsb.applications` for more information about application profile parameters displayed by `bapp`.

CPU time is normalized.

## Options

- w** Displays application profile information in a wide format. Fields are displayed without truncation.
- l** Displays application profile information in a long multiline format. The `-l` option displays the following additional information: application profile description, application profile characteristics and statistics, parameters, resource usage limits, associated commands, and job controls.

### ***application\_profile\_name ...***

Displays information about the specified application profiles.

- h** Prints command usage to `stderr` and exits.
- V** Prints LSF release version to `stderr` and exits.

## Output

### Default Output

Displays the following fields:

#### APPLICATION\_NAME

The name of the application profile. Application profiles are named to correspond to the type of application that usually runs within them.

## Output

<b>NJOBS</b>	The total number of job slots held currently by jobs in the application profile. This includes pending, running, suspended and reserved job slots. A parallel job that is running on $n$ processors is counted as $n$ job slots, since it takes $n$ job slots in the application. See <code>bjobs(1)</code> for an explanation of batch job states.
<b>PEND</b>	The number of job slots used by pending jobs in the application profile.
<b>RUN</b>	The number of job slots used by running jobs in the application profile.
<b>SUSP</b>	The number of job slots used by suspended jobs in the application profile.

## Long Output (-l)

In addition to the above fields, the `-l` option displays the following:

### Description

A description of the typical use of the application profile.

### PARAMETERS/ STATISTICS

#### **SSUSP**

The number of job slots in the application profile allocated to jobs that are suspended by LSF because of load levels or run windows.

#### **USUSP**

The number of job slots in the application profile allocated to jobs that are suspended by the job submitter or by the LSF administrator.

#### **RSV**

The number of job slots in the application profile that are reserved by LSF for pending jobs.

### Per-job resource usage limits

The soft resource usage limits that are imposed on the jobs associated with the application profile. These limits are imposed on a per-job and a per-process basis. The possible per-job limits are:

#### **CPULIMIT**

The maximum CPU time a job can use, in minutes, relative to the CPU factor of the named host. CPULIMIT is scaled by the CPU factor of the execution host so that jobs are allowed more time on slower hosts.

When the job-level CPULIMIT is reached, a SIGXCPU signal is sent to all processes belonging to the job. If the job has no signal handler for SIGXCPU, the job is killed immediately. If the SIGXCPU signal is handled, blocked, or ignored by the application, then after the grace period expires, LSF sends SIGINT, SIGTERM, and SIGKILL to the job to kill it.

#### **MEMLIMIT**

The maximum running set size (RSS) of a process. If a process uses more memory than the limit allows, its priority is reduced so that other processes are more likely to be paged in to available memory. This limit is enforced by the `setrlimit` system call if it supports the `RLIMIT_RSS` option.

By default, the limit is shown in KB. Use `LSF_UNIT_FOR_LIMITS` in `lsf.conf` to specify a larger unit for display (MB, GB, TB, PB, or EB).

#### **PROCESLIMIT**

The maximum number of concurrent processes allocated to a job. If `PROCSLIMIT` is reached, the system sends the following signals in sequence to all processes belonging to the job: `SIGINT`, `SIGTERM`, and `SIGKILL`.

#### **PROCLIMIT**

The maximum number of processors allocated to a job. Jobs that request fewer slots than the minimum `PROCLIMIT` or more slots than the maximum `PROCLIMIT` are rejected. If the job requests minimum and maximum job slots, the maximum slots requested cannot be less than the minimum `PROCLIMIT`, and the minimum slots requested cannot be more than the maximum `PROCLIMIT`.

#### **SWAPLIMIT**

The swap space limit that a job may use. If `SWAPLIMIT` is reached, the system sends the following signals in sequence to all processes in the job: `SIGINT`, `SIGTERM`, and `SIGKILL`.

By default, the limit is shown in KB. Use `LSF_UNIT_FOR_LIMITS` in `lsf.conf` to specify a larger unit for display (MB, GB, TB, PB, or EB).

#### **THREADLIMIT**

The maximum number of concurrent threads allocated to a job. If `THREADLIMIT` is reached, the system sends the following signals in sequence to all processes belonging to the job: `SIGINT`, `SIGTERM`, and `SIGKILL`.

### Per-job resource usage limits

The possible UNIX per-process resource limits are:

- CORELIMIT** The maximum size of a core file. This limit is enforced by the `setrlimit` system call if it supports the `RLIMIT_CORE` option.  
If a job submitted to the application profile has any of these limits specified (see `bsub(1)`), then the lower of the corresponding job limits and application profile limits are used for the job.  
If no resource limit is specified, the resource is assumed to be unlimited.  
By default, the limit is shown in KB. Use `LSF_UNIT_FOR_LIMITS` in `lsf.conf` to specify a larger unit for display (MB, GB, TB, PB, or EB).
- DATALIMIT** The maximum size of the data segment of a process, in KB. This restricts the amount of memory a process can allocate. `DATALIMIT` is enforced by the `setrlimit` system call if it supports the `RLIMIT_DATA` option, and unsupported otherwise.
- FILELIMIT** The maximum file size a process can create, in KB. This limit is enforced by the UNIX `setrlimit` system call if it supports the `RLIMIT_FSIZE` option, or the `ulimit` system call if it supports the `UL_SETFSIZE` option.
- RUNLIMIT** The maximum wall clock time a process can use, in minutes. `RUNLIMIT` is scaled by the CPU factor of the execution host. When a job has been in the `RUN` state for a total of `RUNLIMIT` minutes, LSF sends a `SIGUSR2` signal to the job. If the job does not exit within 5 minutes, LSF sends a `SIGKILL` signal to kill the job.

## Output

**STACKLIMIT** The maximum size of the stack segment of a process. This restricts the amount of memory a process can use for local variables or recursive function calls. **STACKLIMIT** is enforced by the `setrlimit` system call if it supports the `RLIMIT_STACK` option.

By default, the limit is shown in KB. Use `LSF_UNIT_FOR_LIMITS` in `lsf.conf` to specify a larger unit for display (MB, GB, TB, PB, or EB).

**PRE\_EXEC** The `PRE_EXEC` command runs on the execution host before the job associated with the application profile is dispatched to the execution host (or to the first host selected for a parallel batch job).

**POST\_EXEC** The post-execution command for the application profile. The `POST_EXEC` command runs on the execution host after the job finishes.

### **JOB\_INCLUDE\_POSTPROC**

If `JOB_INCLUDE_POSTPROC= Y`, post-execution processing of the job is included as part of the job.

### **JOB\_POSTPROC\_TIMEOUT**

Timeout in minutes for job post-execution processing. If post-execution processing takes longer than the timeout, `sbatchd` reports that post-execution has failed (`POST_ERR` status), and kills the process group of the job's post-execution processes.

### **REQUEUE\_EXIT\_VALUES**

Jobs that exit with these values are automatically requeued.

**RES\_REQ** Resource requirements of the application profile. Only the hosts that satisfy these resource requirements can be used by the application profile.

**JOB\_STARTER** An executable file that runs immediately prior to the batch job, taking the batch job file as an input argument. All jobs submitted to the application profile are run via the job starter, which is generally used to create a specific execution environment before processing the jobs themselves.

**CHUNK\_JOB\_SIZE** Chunk jobs only. Specifies the maximum number of jobs allowed to be dispatched together in a chunk job. All of the jobs in the chunk are scheduled and dispatched as a unit rather than individually. The ideal candidates for job chunking are jobs that typically takes 1 to 2 minutes to run.

**RERUNNABLE** If the `RERUNNABLE` field displays `yes`, jobs in the application profile are rerunnable. That is, jobs in the application profile are automatically restarted or rerun if the execution host becomes unavailable. However, a job in the application profile will not be restarted if you use `bmod` to remove the rerunnable option from the job.

### **RESUME\_CONTROL**

The configured actions for the resume job control. See `RESUME_CONTROL` parameter in `lsb.applications`.

The configured actions are displayed in the format [*action\_type*, *command*] where *action\_type* is RESUME.

## SUSPEND\_CONTROL

The configured actions for the suspend job control. See SUSPEND\_CONTROL parameter in `lsb.applications`.

The configured actions are displayed in the format [*action\_type*, *command*] where *action\_type* is SUSPEND.

## TERMINATE\_CONTROL

The configured actions for terminate job control. See TERMINATE\_CONTROL parameter in `lsb.applications`.

The configured actions are displayed in the format [*action\_type*, *command*] where *action\_type* is TERMINATE.

## See Also

`lsb.applications`, `lsb.queues`, [bsub](#), [bjobs](#), [badmin](#), `mbatchd`

badmin

# badmin

administrative tool for LSF

## Synopsis

```
badmin subcommand
```

```
badmin [-h | -V]
```

## Description

---

**CAUTION:** This command can only be used by LSF administrators.

---

`badmin` provides a set of commands to control and monitor LSF. If no subcommands are supplied for `badmin`, `badmin` prompts for a command from standard input.

Information about each command is available through the `help` command.

The `badmin` commands consist of a set of privileged commands and a set of non-privileged commands. Privileged commands can only be invoked by root or LSF administrators as defined in the configuration file (see `lsf.cluster.cluster(5)` for `ClusterAdmin`). Privileged commands are:

```
reconfig  
mbdrestart  
qopen  
qclose  
qact  
qinact  
hopen  
hclose  
hrestart  
hshutdown  
hstartup  
diagnose
```

The configuration file `lsf.sudoers(5)` has to be set in order to use the privileged command `hstartup` by a non-root user.

All other commands are non-privileged commands and can be invoked by any LSF user. If the privileged commands are to be executed by the LSF administrator, `badmin` must be installed, because it needs to send the request using a privileged port.

For subcommands for which multiple hosts can be specified, do not enclose the host names in quotation marks.

## Subcommand List

```
ckconfig [-v]
```

```

diagnose [job_ID ... | "job_ID[index]" ...]
reconfig [-v] [-f]
mbdrestart [-C comment] [-v] [-f]
qopen [-C comment] [queue_name ... | all]
qclose [-C comment] [queue_name ... | all]
qact [-C comment] [queue_name ... | all]
qinact [-C comment] [queue_name ... | all]
qhist [-t time0,time1] [-f logfile_name] [queue_name ...]
hopen [-C comment] [host_name ... | host_group ... | all]
hclose [-C comment] [host_name ... | host_group ... | all]
hrestart [-f] [host_name ... | all]
hshutdown [-f] [host_name ... | all]
hstartup [-f] [host_name ... | all]
hhist [-t time0,time1] [-f logfile_name] [host_name ...]
mbdhist [-t time0,time1] [-f logfile_name]
hist [-t time0,time1] [-f logfile_name]
hghostadd [-C comment] host_group host_name [host_name ...]
hghostdel [-f] [-C comment] host_group host_name [host_name ...]
help [command ...] | ? [command ...]
quit
mbddebug [-c class_name ...] [-l debug_level] [-f logfile_name] [-o]
mbdtime [-l timing_level] [-f logfile_name] [-o]
sbddebug [-c class_name ...] [-l debug_level] [-f logfile_name] [-o]
    [host_name ...]
sbdtime [-l timing_level] [-f logfile_name] [-o] [host_name ...]
schddebug [-c class_name ...] [-l debug_level] [-f logfile_name]
    [-o]
schdtime [-l timing_level] [-f logfile_name] [-o]
showconf mbd | [sbd [host_name ... | all ]]
perfmon start [sample_period] | stop | view | setperiod sample_period
-h
-V

```

## Options

- subcommand** Executes the specified subcommand. See Usage section.
- h** Prints command usage to `stderr` and exits.
- V** Prints LSF release version to `stderr` and exits.

## Usage

**ckconfig [-v]** Checks LSF configuration files located in the `LSB_CONFDIR/cluster_name/configdir` directory. Also checks configuration in `LSF_ENVDIR/lsf.licensescheduler`.

The `LSB_CONFDIR` variable is defined in `lsf.conf` (see `lsf.conf(5)`) which is in `LSF_ENVDIR` or `/etc` (if `LSF_ENVDIR` is not defined).

By default, `badadmin ckconfig` displays only the result of the configuration file check. If warning errors are found, `badadmin` prompts you to display detailed messages.

**-v**

Verbose mode. Displays detailed messages about configuration file checking to `stderr`.

**diagnose [job\_ID ... | "job\_ID" ...]**

Displays full pending reason list if `CONDENSE_PENDING_REASONS=Y` is set in `lsb.params`. For example:

```
badadmin diagnose 1057
```

**reconfig [-v] [-f]** Dynamically reconfigures LSF without restarting `mbatchd`.

Configuration files are checked for errors and the results displayed to `stderr`. If no errors are found in the configuration files, a reconfiguration request is sent to `mbatchd` and configuration files are reloaded.

With this option, `mbatchd` and `mbschd` are not restarted and `lsb.events` is not replayed. To restart `mbatchd` and `mbschd`, and replay `lsb.events`, use `badadmin mbdrestart`.

When you issue this command, `mbatchd` is available to service requests while reconfiguration files are reloaded. Configuration changes made since system boot or the last reconfiguration take effect.

If warning errors are found, `badadmin` prompts you to display detailed messages. If fatal errors are found, reconfiguration is not performed, and `badadmin` exits.

If you add a host to a queue, the new host will not be recognized by jobs that were submitted before you reconfigured. If you want the new host to be recognized, you must use the command `badadmin mbdrestart`.

If you add a host to a host group, the new host will not be recognized by jobs that were submitted before you reconfigured. If you want the new host to be recognized, you must use the command `badadmin mbdrestart`.

Resource requirements determined by the queue no longer apply to a running job after running `badadmin reconfig`. For example, if you change the `RES_REQ` parameter in a queue and reconfigure the cluster, the previous queue-level resource requirements for running jobs are lost.

**-v**

Verbose mode. Displays detailed messages about the status of the configuration files. Without this option, the default is to display the results of configuration file checking. All messages from the configuration file check are printed to `stderr`.

**-f**

Disables interaction and proceeds with reconfiguration if configuration files contain no fatal errors.

**mbdrestart [-C *comment*] [-v] [-f]**

Dynamically reconfigures LSF and restarts `mbatchd` and `mbschd`.

Configuration files are checked for errors and the results printed to `stderr`. If no errors are found, configuration files are reloaded, `mbatchd` and `mbschd` are restarted, and events in `lsb.events` are replayed to recover the running state of the last `mbatchd`. While `mbatchd` restarts, it is unavailable to service requests.

If warning errors are found, `badmin` prompts you to display detailed messages. If fatal errors are found, `mbatchd` and `mbschd` restart is not performed, and `badmin` exits.

If `lsb.events` is large, or many jobs are running, restarting `mbatchd` can take several minutes. If you only need to reload the configuration files, use `badmin reconfig`.

**-C *comment***

Logs the text of *comment* as an administrator comment record to `lsb.events`. The maximum length of the comment string is 512 characters.

**-v**

Verbose mode. Displays detailed messages about the status of configuration files. All messages from configuration checking are printed to `stderr`.

**-f**

Disables interaction and forces reconfiguration and `mbatchd` restart to proceed if configuration files contain no fatal errors.

**qopen [-C *comment*] [*queue\_name* ... | all]**

Opens specified queues, or all queues if the reserved word `all` is specified. If no queue is specified, the system default queue is assumed (see `lsb.queues(5)` for `DEFAULT_QUEUE`). A queue can accept batch jobs only if it is open.

**-C *comment***

Logs the text of *comment* as an administrator comment record to `lsb.events`. The maximum length of the comment string is 512 characters.

**qclose [-C *comment*] [*queue\_name* ... | all]**

Closes specified queues, or all queues if the reserved word `all` is specified. If no queue is specified, the system default queue is assumed. A queue will not accept any job if it is closed.

**-C *comment***

Logs the text of

as an administrator comment record to `lsb.events`. The maximum length of the comment string is 512 characters.

**qact [-C *comment*] [*queue\_name* ... | all]**

Activates specified queues, or all queues if the reserved word `all` is specified. If no queue is specified, the system default queue is assumed. Jobs in a queue can be dispatched if the queue is activated.

## Usage

A queue inactivated by its run windows cannot be reactivated by this command (see `lsb.queues(5)` for `RUN_WINDOW`).

### **-C comment**

Logs the text of comment as an administrator comment record to `lsb.events`. The maximum length of the comment string is 512 characters.

### **qinact [-C comment] [queue\_name ... | all]**

Inactivates specified queues, or all queues if the reserved word `all` is specified. If no queue is specified, the system default queue is assumed. No job in a queue can be dispatched if the queue is inactivated.

### **-C comment**

Logs the text of comment as an administrator comment record to `lsb.events`. The maximum length of the comment string is 512 characters.

### **qhist [-t time0,time1] [-f logfile\_name] [queue\_name ...]**

Displays historical events for specified queues, or for all queues if no queue is specified. Queue events are queue opening, closing, activating and inactivating.

### **-t time0,time1**

Displays only those events that occurred during the period from `time0` to `time1`. See `bhist(1)` for the time format. The default is to display all queue events in the event log file (see below).

### **-f logfile\_name**

Specify the file name of the event log file. Either an absolute or a relative path name may be specified. The default is to use the event log file currently used by the LSF system: `LSB_SHAREDIR/cluster_name/logdir/lsb.events`. Option `-f` is useful for offline analysis.

If you specified an administrator comment with the `-C` option of the queue control commands `qclose`, `qopen`, `qact`, and `qinact`, `qhist` displays the comment text.

### **hopen [-C comment] [host\_name ... | host\_group ... | all]**

Opens batch server hosts. Specify the names of any server hosts or host groups (see `bmgroup`). All batch server hosts will be opened if the reserved word `all` is specified. If no host or host group is specified, the local host is assumed. A host accepts batch jobs if it is open.

---

**IMPORTANT:** If EGO-enabled SLA scheduling is configured through `ENABLE_DEFAULT_EGO_SLA` in `lsb.params`, and a host is closed by EGO, it cannot be reopened by `admin hopen`. Hosts closed by EGO have status `closed_EGO` in `bhosts -l` output.

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### **-C comment**

Logs the text of comment as an administrator comment record to `lsb.events`. The maximum length of the comment string is 512 characters. If you open a host group, each host group member displays with the same comment string.

### **hclose [-C comment] [host\_name ... | host\_group ... | all]**

Closes batch server hosts. Specify the names of any server hosts or host groups (see `bmgroup`). All batch server hosts will be closed if the reserved word `all` is specified. If no argument is specified, the local host is assumed. A closed host will not accept

any new job, but jobs already dispatched to the host will not be affected. Note that this is different from a host closed by a window; all jobs on it are suspended in that case.

**-C *comment***

Logs the text of *comment* as an administrator comment record to `lsb.events`. The maximum length of the comment string is 512 characters. If you close a host group, each host group member displays with the same comment string.

**hghostadd [-C *comment*] *host\_group host\_name [host\_name ...]***

Dynamically adds hosts to a host group. After receiving the host information from the master LIM, `mbatchd` dynamically adds the host without triggering a `reconfig`.

Once the host is added to the group, it will be considered to be part of that group with respect to scheduling decision making for both newly submitted jobs and for existing pending jobs.

This command fails if any of the specified host groups or host names are not valid.

To enable dynamic host configuration, define `LSF_MASTER_LIST` and `LSF_DYNAMIC_HOST_WAIT_TIME` in `lsf.conf` and `LSF_HOST_ADDR_RANGE` in `lsf.cluster.cluster_name`.

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**RESTRICTION:** If EGO-enabled SLA scheduling is configured through `ENABLE_DEFAULT_EGO_SLA` in `lsb.params`, you cannot use `hghostadd` because all host allocation is under control of Platform EGO.

---

**-C *comment***

Logs the text of *comment* as an administrator comment record to `lsb.events`. The maximum length of the comment string is 512 characters.

**hghostdel [-f] [-C *comment*] *host\_group host\_name [host\_name ...]***

Dynamically deletes hosts from a host group by triggering an `mbatchd reconfig`

This command fails if any of the specified host groups or host names are not valid.

---

**CAUTION:** If you want to change a dynamic host to a static host, first use the command `badmin hghostdel` to remove the dynamic host from any host group that it belongs to, and then configure the host as a static host in `lsf.cluster.cluster_name`.

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**RESTRICTION:** If EGO-enabled SLA scheduling is configured through `ENABLE_DEFAULT_EGO_SLA` in `lsb.params`, you cannot use `hghostdel` because all host allocation is under control of Platform EGO.

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**hrestart [-f] [*host\_name ...* | **all**]**

Restarts `sbatchd` on the specified hosts, or on all server hosts if the reserved word `all` is specified. If no host is specified, the local host is assumed. `sbatchd` will rerun itself from the beginning. This allows new `sbatchd` binaries to be used.

**-f**

Disables interaction and does not ask for confirmation for restarting `sbatchd`.

**hshutdown [-f] [*host\_name ...* | **all**]**

## Usage

Shuts down `sbatchd` on the specified hosts, or on all batch server hosts if the reserved word `all` is specified. If no host is specified, the local host is assumed. `sbatchd` will exit upon receiving the request.

**-f**

Disables interaction and does not ask for confirmation for shutting down `sbatchd`.

### **hstartup [-f] [host\_name ... | all]**

Starts `sbatchd` on the specified hosts, or on all batch server hosts if the reserved word `all` is specified. Only `root` and users listed in the file `lsf.sudoers(5)` can use the `all` and `-f` options. These users must be able to use `rsh` or `ssh` on all LSF hosts without having to type in passwords. If no host is specified, the local host is assumed.

The shell command specified by `LSF_RSH` in `lsf.conf` is used before `rsh` is tried.

**-f**

Disables interaction and does not ask for confirmation for starting `sbatchd`.

### **hhist [-t time0,time1] [-f logfile\_name] [host\_name ...]**

Displays historical events for specified hosts, or for all hosts if no host is specified. Host events are host opening and closing. Options `-t` and `-f` are exactly the same as those of `qhst` (see above).

If you specified an administrator comment with the `-C` option of the host control commands `hclose` or `hopen`, `hhist` displays the comment text.

### **mbdhist [-t time0,time1] [-f logfile\_name]**

Displays historical events for `mbatchd`. Events describe the starting and exiting of `mbatchd`. Options `-t` and `-f` are exactly the same as those of `qhst` (see above).

If you specified an administrator comment with the `-C` option of the `mbdrestart` command, `mbdhist` displays the comment text.

### **hist [-t time0,time1] [-f logfile\_name]**

Displays historical events for all the queues, hosts and `mbatchd`. Options `-t` and `-f` are exactly the same as those of `qhst` (see above).

If you specified an administrator comment with the `-C` option of the queue, host, and `mbatchd` commands, `hist` displays the comment text.

### **help [command ...] | ? [command ...]**

Displays the syntax and functionality of the specified commands.

**quit** Exits the `badmin` session.

### **mbddebug [-c class\_name ...] [-l debug\_level] [-f logfile\_name] [-o]**

Sets message log level for `mbatchd` to include additional information in log files. You must be `root` or the LSF administrator to use this command.

See `sbddebug` for an explanation of options.

### **mbdtime [-l timing\_level] [-f logfile\_name] [-o]**

Sets timing level for `mbatchd` to include additional timing information in log files. You must be `root` or the LSF administrator to use this command. See `sbdtime` for an explanation of options.

**sbdddebug [-c *class\_name* ...] [-l *debug\_level*] [-f *logfile\_name*] [-o] [*host\_name* ...]**

Sets the message log level for `sbatchd` to include additional information in log files. You must be `root` or the LSF administrator to use this command.

In MultiCluster, debug levels can only be set for hosts within the same cluster. For example, you could not set debug or timing levels from a host in clusterA for a host in clusterB. You need to be on a host in clusterB to set up debug or timing levels for clusterB hosts.

If the command is used without any options, the following default values are used:

*class\_name*=0 (no additional classes are logged)

*debug\_level*=0 (LOG\_DEBUG level in parameter LSF\_LOG\_MASK)

*logfile\_name*=current LSF system log file in the LSF system log file directory, in the format *daemon\_name.log.host\_name*

*host\_name*=local host (host from which command was submitted)

**-c *class\_name* ...**

Specifies software classes for which debug messages are to be logged.

Format of *class\_name* is the name of a class, or a list of class names separated by spaces and enclosed in quotation marks. Classes are also listed in `lsf.h`.

Valid log classes are:

- ◆ LC\_AFS - Log AFS messages
- ◆ LC\_AUTH - Log authentication messages
- ◆ LC\_CHKPNT - Log checkpointing messages
- ◆ LC\_COMM - Log communication messages
- ◆ LC\_CONF - Print out all parameters in `lsb.params`
- ◆ LC\_DCE - Log messages pertaining to DCE support
- ◆ LC\_EEVENTD - Log eventd messages
- ◆ LC\_ELIM - Log ELIM messages
- ◆ LC\_EXEC - Log significant steps for job execution
- ◆ LC\_FAIR - Log fairshare policy messages
- ◆ LC\_FILE - Log file transfer messages
- ◆ LC\_HANG - Mark where a program might hang
- ◆ LC\_JARRAY - Log job array messages
- ◆ LC\_JLIMIT - Log job slot limit messages
- ◆ LC\_LICENSE - Log license management messages (LC\_LICENSE is also supported for backward compatibility)
- ◆ LC\_LOADINDX - Log load index messages
- ◆ LC\_M\_LOG - Log multievent logging messages
- ◆ LC\_MPI - Log MPI messages
- ◆ LC\_MULTI - Log messages pertaining to MultiCluster
- ◆ LC\_PEND - Log messages related to job pending reasons
- ◆ LC\_PERFM - Log performance messages

- ◆ LC\_PIM - Log PIM messages
- ◆ LC\_PREEMPT - Log preemption policy messages
- ◆ LC\_SIGNAL - Log messages pertaining to signals
- ◆ LC\_SYS - Log system call messages
- ◆ LC\_TRACE - Log significant program walk steps
- ◆ LC\_XDR - Log everything transferred by XDR

Default: 0 (no additional classes are logged)

**-l *debug\_level***

Specifies level of detail in debug messages. The higher the number, the more detail that is logged. Higher levels include all lower levels.

Possible values:

0 LOG\_DEBUG level in parameter LSF\_LOG\_MASK in `lsf.conf`.

1 LOG\_DEBUG1 level for extended logging. A higher level includes lower logging levels. For example, LOG\_DEBUG3 includes LOG\_DEBUG2 LOG\_DEBUG1, and LOG\_DEBUG levels.

2 LOG\_DEBUG2 level for extended logging. A higher level includes lower logging levels. For example, LOG\_DEBUG3 includes LOG\_DEBUG2 LOG\_DEBUG1, and LOG\_DEBUG levels.

3 LOG\_DEBUG3 level for extended logging. A higher level includes lower logging levels. For example, LOG\_DEBUG3 includes LOG\_DEBUG2, LOG\_DEBUG1, and LOG\_DEBUG levels.

Default: 0 (LOG\_DEBUG level in parameter LSF\_LOG\_MASK)

**-f *logfile\_name***

Specify the name of the file into which debugging messages are to be logged. A file name with or without a full path may be specified.

If a file name without a path is specified, the file will be saved in the LSF system log directory.

The name of the file that will be created will have the following format:

*logfile\_name.daemon\_name.log.host\_name*

On UNIX, if the specified path is not valid, the log file is created in the `/tmp` directory.

On Windows, if the specified path is not valid, no log file is created.

Default: current LSF system log file in the LSF system log file directory.

**-o**

Turns off temporary debug settings and resets them to the daemon starting state. The message log level is reset back to the value of LSF\_LOG\_MASK and classes are reset to the value of LSB\_DEBUG\_MBD, LSB\_DEBUG\_SBD.

The log file is also reset back to the default log file.

***host\_name ...***

Optional. Sets debug settings on the specified host or hosts.

Lists of host names must be separated by spaces and enclosed in quotation marks.

Default: local host (host from which command was submitted)

**sbdtime [-l *timing\_level*] [-f *logfile\_name*] [-o] [*host\_name ...*]**

Sets the timing level for `sbatchd` to include additional timing information in log files. You must be `root` or the LSF administrator to use this command.

In MultiCluster, timing levels can only be set for hosts within the same cluster. For example, you could not set debug or timing levels from a host in clusterA for a host in clusterB. You need to be on a host in clusterB to set up debug or timing levels for clusterB hosts.

If the command is used without any options, the following default values are used:

*timing\_level*=no timing information is recorded

*logfile\_name*=current LSF system log file in the LSF system log file directory, in the format *daemon\_name.log.host\_name*

*host\_name*=local host (host from which command was submitted)

**-l *timing\_level***

Specifies detail of timing information that is included in log files. Timing messages indicate the execution time of functions in the software and are logged in milliseconds.

Valid values: 1 | 2 | 3 | 4 | 5

The higher the number, the more functions in the software that are timed and whose execution time is logged. The lower numbers include more common software functions. Higher levels include all lower levels.

Default: undefined (no timing information is logged)

**-f *logfile\_name***

Specify the name of the file into which timing messages are to be logged. A file name with or without a full path may be specified.

If a file name without a path is specified, the file will be saved in the LSF system log file directory.

The name of the file created has the following format:

*logfile\_name.daemon\_name.log.host\_name*

On UNIX, if the specified path is not valid, the log file is created in the `/tmp` directory.

On Windows, if the specified path is not valid, no log file is created.

*Note:* Both timing and debug messages are logged in the same files.

Default: current LSF system log file in the LSF system log file directory, in the format *daemon\_name.log.host\_name*.

**-o**

Optional. Turn off temporary timing settings and reset them to the daemon starting state. The timing level is reset back to the value of the parameter for the corresponding daemon (`LSB_TIME_MBD`, `LSB_TIME_SBD`).

The log file is also reset back to the default log file.

***host\_name ...***

## Usage

Sets the timing level on the specified host or hosts.

Lists of hosts must be separated by spaces and enclosed in quotation marks.

Default: local host (host from which command was submitted)

### **schddebug [-c *class\_name* ...] [-l *debug\_level*] [-f *logfile\_name*] [-o]**

Sets message log level for `mbschd` to include additional information in log files. You must be `root` or the LSF administrator to use this command.

See `sbddebug` for an explanation of options.

### **schdtime [-l *timing\_level*] [-f] [-o]**

Sets timing level for `mbschd` to include additional timing information in log files. You must be `root` or the LSF administrator to use this command.

See `sbdtime` for an explanation of options.

### **showconf mbd | [sbd [ *host\_name* ... | all ]]**

Display all configured parameters and their values set in `lsf.conf` or `ego.conf` that affect `mbatchd` and `sbatchd`.

In a MultiCluster environment, `badmin showconf` only displays the parameters of daemons on the local cluster.

Running `badmin showconf` from a master candidate host will reach all server hosts in the cluster. Running `badmin showconf` from a slave-only host may not be able to reach other slave-only hosts.

`badmin showconf` only displays the values used by LSF.

For example, if you define `LSF_MASTER_LIST` in `lsf.conf`, and `EGO_MASTER_LIST` in `ego.conf`, `badmin showconf` displays the value of `EGO_MASTER_LIST`.

`badmin showconf` displays the value of `EGO_MASTER_LIST` from wherever it is defined. You can define either `LSF_MASTER_LIST` or `EGO_MASTER_LIST` in `lsf.conf`. `LIM` reads `lsf.conf` first, and `ego.conf` if `EGO` is enabled in the LSF cluster. The value of `LSF_MASTER_LIST` is displayed only if `EGO_MASTER_LIST` is not defined at all in `ego.conf`.

For example, if `EGO` is enabled in the LSF cluster, and you define `LSF_MASTER_LIST` in `lsf.conf`, and `EGO_MASTER_LIST` in `ego.conf`, `badmin showconf` displays the value of `EGO_MASTER_LIST` in `ego.conf`.

If `EGO` is disabled, `ego.conf` not loaded, so whatever is defined in `lsf.conf` is displayed.

### **perfmon start [*sample\_period*] | stop | view | setperiod *sample\_period***

Dynamically enables and controls scheduler performance metric collection.

Collecting and recording performance metric data may affect the performance of LSF. Smaller sampling periods will result in the `lsb.streams` file growing faster.

The following metrics are collected and recorded in each sample period:

- ◆ The number of queries handled by `mbatchd`
- ◆ The number of queries for each of jobs, queues, and hosts. (`bjobs`, `bqueues`, and `bhosts`, as well as other daemon requests)

- ◆ The number of jobs submitted (divided into job submission requests and jobs actually submitted)
- ◆ The number of jobs dispatched
- ◆ The number of jobs completed
- ◆ The numbers of jobs sent to remote cluster
- ◆ The numbers of jobs accepted by from cluster

**start** [*sample\_period*]

Start performance metric collection dynamically and specifies an optional sampling period in seconds for performance metric collection.

If no sampling period is specified, the default period set in SCHED\_METRIC\_SAMPLE\_PERIOD in `lsb.params` is used.

**stop**

Stop performance metric collection dynamically.

**view**

Display real time performance metric information for the current sampling period

**setperiod** *sample\_period*

Set a new sampling period in seconds.

## See Also

[bqueues](#), [bhosts](#), `lsb.params`, `lsb.queues`, `lsb.hosts`, `lsf.conf`, `lsf.cluster`, `sbatchd`, `mbatchd`, `mbschd`

# bbot

moves a pending job relative to the last job in the queue

## Synopsis

```
bbot job_ID | "job_ID[index_list]" [position]
```

```
bbot [-h | -V]
```

## Description

Changes the queue position of a pending job, or a pending job array element, to affect the order in which jobs are considered for dispatch.

By default, LSF dispatches jobs in a queue in the order of arrival (that is, first-come-first-served), subject to availability of suitable server hosts.

The `bbot` command allows users and the LSF administrator to manually change the order in which jobs are considered for dispatch. Users can only operate on their own jobs, whereas the LSF administrator can operate on any user's jobs. Users can only change the relative position of their own jobs.

If invoked by the LSF administrator, `bbot` moves the selected job after the last job with the same priority submitted to the queue. The positions of all users' jobs in the queue can be changed by the LSF administrator.

If invoked by a regular user, `bbot` moves the selected job after the last job with the same priority submitted by the user to the queue.

Pending jobs are displayed by `bjobs` in the order in which they will be considered for dispatch.

A user may use `bbot` to change the dispatch order of their jobs scheduled using a fairshare policy. However, if a job scheduled using a fairshare policy is moved by the LSF administrator using `btop`, the job will not be subject to further fairshare scheduling unless the same job is subsequently moved by the LSF administrator using `bbot`; in this case the job will be scheduled again using the same fairshare policy (see the `FAIRSHARE` keyword in `lsb.queues(5)` and `HostPartition` keyword in `lsb.hosts(5)`).

To prevent users from changing the queue position of a pending job with `bbot`, configure `JOB_POSITION_CONTROL_BY_ADMIN=Y` in `lsb.params`.

You cannot run `btop` on jobs pending in an absolute priority scheduling (APS) queue.

## Options

**`job_ID | "job_ID[index_list]"`**

Required. Job ID of the job or job array on which to operate.

For a job array, the index list, the square brackets, and the quotation marks are required. An index list is used to operate on a job array. The index list is a comma separated list whose elements have the syntax `start_index[-end_index[:step]]` where `start_index`, `end_index` and `step` are positive integers. If the step is omitted, a

step of one is assumed. The job array index starts at one. The maximum job array index is 1000. All jobs in the array share the same job\_ID and parameters. Each element of the array is distinguished by its array index.

**position** Optional. The position argument can be specified to indicate where in the queue the job is to be placed. position is a positive number that indicates the target position of the job from the end of the queue. The positions are relative to only the applicable jobs in the queue, depending on whether the invoker is a regular user or the LSF administrator. The default value of 1 means the position is after all other jobs with the same priority.

**-h** Prints command usage to `stderr` and exits.

**-v** Prints LSF release version to `stderr` and exits.

## See Also

[bjobs\(1\)](#), [bswitch\(1\)](#), [btop\(1\)](#), `JOB_POSITION_CONTROL_BY_ADMIN` in `lsb.params`

# bchkpnt

checkpoints one or more checkpointable jobs

## Synopsis

```
bchkpnt [-f] [-k] [-p minutes | -p 0]
        [job_ID | "job_ID[index_list]" ] ...
bchkpnt [-f] [-k] [-p minutes | -p 0] [-J job_name]
        [-m host_name | -m host_group] [-q queue_name]
        [-u "user_name" | -u all] [0]
bchkpnt [-h | -V]
```

## Description

Checkpoints your running (RUN) or suspended (SSUSP, USUSP, and PSUSP) checkpointable jobs. LSF administrators and root can checkpoint jobs submitted by other users.

By default, checkpoints one job, the most recently submitted job, or the most recently submitted job that also satisfies other specified options (-m, -q, -u and -J). Specify -0 (zero) to checkpoint multiple jobs. Specify a job ID to checkpoint one specific job.

By default, jobs continue to execute after they have been checkpointed.

To submit a checkpointable job, use `bsub -k` or submit the job to a checkpoint queue (CHKPNT in `lsb.queues(5)`). Use `brestart(1)` to start checkpointed jobs.

LSF invokes the `echkpnt(8)` executable found in `LSF_SERVERDIR` to perform the checkpoint.

Only running members of a chunk job can be checkpointed. For chunk jobs in WAIT state, `mbatchd` rejects the checkpoint request.

## Options

- 0** (Zero). Checkpoints multiple jobs. Checkpoints all the jobs that satisfy other specified options (-m, -q, -u and -J).
- f** Forces a job to be checkpointed even if non-checkpointable conditions exist (these conditions are OS-specific).
- k** Kills a job after it has been successfully checkpointed.
- p *minutes* | -p 0** Enables periodic checkpointing and specifies the checkpoint period, or modifies the checkpoint period of a checkpointed job. Specify -p 0 (zero) to disable periodic checkpointing.  
 Checkpointing is a resource-intensive operation. To allow your job to make progress while still providing fault tolerance, specify a checkpoint period of 30 minutes or longer.
- J *job\_name*** Only checkpoints jobs that have the specified job name.
- m *host\_name* | -m *host\_group***

Only checkpoints jobs dispatched to the specified hosts.

**-q *queue\_name***

Only checkpoints jobs dispatched from the specified queue.

**-u "*user\_name*" | -u all**

Only checkpoints jobs submitted by the specified users. The keyword `all` specifies all users. Ignored if a job ID other than 0 (zero) is specified. To specify a Windows user account, include the domain name in uppercase letters and use a single backslash (`DOMAIN_NAME\user_name`) in a Windows command line or a double backslash (`DOMAIN_NAME\\user_name`) in a UNIX command line.

***job\_ID* | "*job\_ID[index\_list]*"**

Checkpoints only the specified jobs.

**-h** Prints command usage to `stderr` and exits.

**-v** Prints LSF release version to `stderr` and exits.

## Examples

```
bchkpnt 1234
```

Checkpoints the job with job ID 1234.

```
bchkpnt -p 120 1234
```

Enables periodic checkpointing or changes the checkpoint period to 120 minutes (2 hours) for a job with job ID 1234.

```
bchkpnt -m hostA -k -u all 0
```

When issued by root or the LSF administrator, will checkpoint and kill all checkpointable jobs on `hostA`. This is useful when a host needs to be shut down or rebooted.

## See Also

[bsub\(1\)](#), [bmod\(1\)](#), [brestart\(1\)](#), [bjobs\(1\)](#), [bqueues\(1\)](#), [bhosts\(1\)](#), [libckpt.a\(3\)](#), [lsb.queues\(5\)](#), [eckpnt\(8\)](#), [erestart\(8\)](#), [mbatchd\(8\)](#)

# bclusters

displays MultiCluster information

## Synopsis

```
bclusters [-app]
```

```
bclusters [-h | -V]
```

## Description

For the job forwarding model, displays a list of MultiCluster queues together with their relationship with queues in remote clusters.

For the resource leasing model, displays remote resource provider and consumer information, resource flow information, and connection status between the local and remote cluster.

## Options

- app** Displays available application profiles in remote clusters.
- h** Prints command usage to `stderr` and exits.
- V** Prints LSF release version to `stderr` and exits.

## Output

### Job Forwarding Information

Displays a list of MultiCluster queues together with their relationship with queues in remote clusters.

Information related to the job forwarding model is displayed under the heading `Job Forwarding Information`.

### LOCAL\_QUEUE

Name of a local MultiCluster send-jobs or receive-jobs queue.

### JOB\_FLOW

Indicates direction of job flow.

#### **send**

The local queue is a MultiCluster send-jobs queue (`SNDJOBS_TO` is defined in the local queue).

#### **rcv**

The local queue is a MultiCluster receive-jobs queue (`RCVJOBS_FROM` is defined in the local queue).

### REMOTE

For send-jobs queues, shows the name of the receive-jobs queue in a remote cluster. For receive-jobs queues, always “-”.

### CLUSTER

For send-jobs queues, shows the name of the remote cluster containing the receive-jobs queue.

For receive-jobs queues, shows the name of the remote cluster that can send jobs to the local queue.

## STATUS

Indicates the connection status between the local queue and remote queue.

### **ok**

The two clusters can exchange information and the system is properly configured.

### **disc**

Communication between the two clusters has not been established. This could occur because there are no jobs waiting to be dispatched, or because the remote master cannot be located.

### **reject**

The remote queue rejects jobs from the send-jobs queue. The local queue and remote queue are connected and the clusters communicate, but the queue-level configuration is not correct. For example, the send-jobs queue in the submission cluster points to a receive-jobs queue that does not exist in the remote cluster.

If the job is rejected, it returns to the submission cluster.

## Resource Lease Information

Displays remote resource provider and consumer information, resource flow information, and connection status between the local and remote cluster.

Information related to the resource leasing model is displayed under the heading `Resource Lease Information`.

## REMOTE\_CLUSTER

For borrowed resources, name of the remote cluster that is the provider.

For exported resources, name of the remote cluster that is the consumer.

## RESOURCE\_FLOW

Indicates direction of resource flow.

### **IMPORT**

Local cluster is the consumer and borrows resources from the remote cluster (HOSTS parameter in one or more local queue definitions includes remote resources).

### **EXPORT**

Local cluster is the provider and exports resources to the remote cluster.

## STATUS

Indicates the connection status between the local and remote cluster.

### **ok**

MultiCluster jobs can run.

### **disc**

No communication between the two clusters. This could be a temporary situation or could indicate a MultiCluster configuration error.

### **conn**

The two clusters communicate, but the lease is not established. This should be a temporary situation.

Files

## Remote Cluster Application Information

`bcluster -app` displays information related to application profile configuration under the heading `Remote Cluster Application Information`. Application profile information is only displayed for the job forwarding model. `bclusters` does not show local cluster application profile information.

<code>REMOTE_CLUSTER</code>	The name of the remote cluster.
<code>APP_NAME</code>	The name of the application profile available in the remote cluster.
<code>DESCRIPTION</code>	The description of the application profile.

## Files

Reads `lsb.queues` and `lsb.applications`.

## See Also

[bapp](#), [bhosts](#), [bqueues](#), [lsclusters](#), [lsinfo](#), [lsb.queues](#)

# bgadd

creates job groups

## Synopsis

```
bgadd [-L limit] [-sla service_class_name] job_group_name
```

```
bgadd [-h | -V]
```

## Description

Creates a job group with the job group name specified by *job\_group\_name*.

You must provide full group path name for the new job group. The last component of the path is the name of the new group to be created.

You do not need to create the parent job group before you create a sub-group under it. If no groups in the job group hierarchy exist, all groups are created with the specified hierarchy.

## Options

**-L *limit*** Specifies the maximum number of concurrent jobs allowed to run under the job group (including child groups) -L limits the number of started jobs (RUN, SSUSP, USSUP) under the job group.

Specify a positive number between 0 and 2147483647. If the specified limit is zero (0), no jobs under the job group can run.

You cannot specify a limit for the root job group. The root job group has no job limit. Job groups added with no limits specified inherit any limits of existing parent job groups. The -L option only limits the lowest level job group created.

If a parallel job requests 2 CPUs (`bsub -n 2`), the job group limit is per job, not per slots used by the job.

By default, a job group has no job limit. Limits persist across `mbatchd` restart or reconfiguration.

**-sla *service\_class\_name***

The name of a service class defined in `lsb.serviceclasses`, or the name of the SLA defined in `ENABLE_DEFAULT_EGO_SLA` in `lsb.params`. The job group is attached to the specified SLA.

***job\_group\_name*** Full path of the job group name.

**-h** Prints command usage to `stderr` and exits.

**-V** Prints LSF release version to `stderr` and exits.

## Examples

◆ Create a job group named `risk_group` under the root group `/`:

```
bgadd /risk_group
```

See Also

- ◆ Create a job group named `portfolio1` under job group `/risk_group`:  
`bgadd /risk_group/portfolio1`

See Also

[bgdel](#), [bjgroup](#)

# bgdel

deletes job groups

## Synopsis

```
bgdel job_group_name ...
```

```
bgdel [-h | -V]
```

## Description

Deletes a job group with the job group name specified by *job\_group\_name* and all its subgroups.

You must provide full group path name for the job group to be deleted. The job group cannot contain any jobs.

## Options

- job\_group\_name*** Full path of the job group name.
- h** Prints command usage to `stderr` and exits.
- V** Prints LSF release version to `stderr` and exits.

## Example

```
bgdel /risk_group  
Job group /risk_group is deleted.  
deletes the job group /risk_group and all its subgroups.
```

## See Also

[bgadd\(1\)](#), [bjgroup\(1\)](#)

# bgmod

modifies job groups

## Synopsis

```
bgmod [-L limit | -Ln] job_group_name
bgmod [-h | -V]
```

## Description

Modifies the job group with the job group name specified by *job\_group\_name*.

Only root, LSF administrators, the job group creator, or the creator of the parent job groups can use `bgmod` to modify a job group limit.

You must provide full group path name for the modified job group. The last component of the path is the name of the job group to be modified.

## Options

**-L *limit*** Changes the limit of *job\_group\_name* to the specified *limit* value. If the job group has parent job groups, the new limit cannot exceed the limits of any higher level job groups. Similarly, if the job group has child job groups, the new value must be greater than any limits on the lower level job groups.

*limit* specifies the maximum number of concurrent jobs allowed to run under the job group (including child groups) -L limits the number of started jobs (RUN, SSUSP, USSUP) under the job group.

Specify a positive number between 0 and 2147483647. If the specified limit is zero (0), no jobs under the job group can run.

You cannot specify a limit for the root job group. The root job group has no job limit. The -L option only limits the lowest level job group specified.

If a parallel job requests 2 CPUs (`bsub -n 2`), the job group limit is per job, not per slots used by the job.

**-Ln** Removes the existing job limit for the job group. If the the job group has parent job groups, the job modified group automatically inherits any limits from its direct parent job group.

***job\_group\_name*** Full path of the job group name.

**-h** Prints command usage to `stderr` and exits.

**-V** Prints LSF release version to `stderr` and exits.

## Examples

The following command only modifies the limit of group `/canada/projects/test1`. It does not modify limits of `/canada` or `/canada/projects`.

```
bgmod -L 6 /canada/projects/test1
```

To modify limits of `/canada` or `/canada/projects`, you must specify the exact group name:

```
bgmod -L 6 /canada
```

or

```
bgmod -L 6 /canada/projects
```

## See Also

[bgadd](#), [bgdel](#), [bjgroup](#)

# bhist

displays historical information about jobs

## Synopsis

```
bhist [-a | -d | -e | -p | -r | -s] [-b | -w] [-l]
      [-C start_time,end_time] [-D start_time,end_time]
      [-f logfile_name | -n number_logfiles | -n 0]
      [-S start_time,end_time] [-J job_name] [-Lp ls_project_name]
      [-m host_name] [-N host_name | -N host_model | -N CPU_factor]
      [-P project_name] [-q queue_name] [-u user_name | -u all]
bhist [-t] [-f logfile_name] [-T start_time,end_time]
bhist [-J job_name] [-N host_name | -N host_model | -N cpu_factor]
      [job_ID ... | "job_ID[index]" ...]
bhist [-h | -V]
```

## Description

By default:

- ◆ Displays information about your own pending, running and suspended jobs. Groups information by job
- ◆ CPU time is not normalized
- ◆ Searches the event log file currently used by the LSF system:  
\$LSB\_SHAREDIR/*cluster\_name*/logdir/lsb.events (see `lsb.events(5)`)
- ◆ Displays events occurring in the past week, but this can be changed by setting the environment variable `LSB_BHIST_HOURS` to an alternative number of hours

If neither `-l` nor `-b` is present, the default is to display only the fields shown in [Output](#) on page 51.

## Options

- a** Displays information about both finished and unfinished jobs.  
This option overrides `-d`, `-p`, `-s`, and `-r`.
- b** Brief format. Displays the information in a brief format. If used with the `-s` option, shows the reason why each job was suspended.
- d** Only displays information about finished jobs.
- e** Only displays information about exited jobs.
- l** Long format. Displays additional information. If used with `-s`, shows the reason why each job was suspended.

If you submitted a job using the `OR (|)` expression to specify alternative resources, this option displays the successful `Execution rusage string` with which the job ran.

If you submitted a job with multiple resource requirement strings using the `bsub -R` option for the order, same, rusage, and select sections, `bjobs -l` displays a single, merged resource requirement string for those sections, as if they were submitted using a single `-R`.

`bhist -l` can display job exit codes. A job with exit code 131 means that the job exceeded a configured resource usage limit and LSF killed the job with signal 3 (131-128=3).

`bhist -l` can display changes to pending jobs as a result of the following `bmod` options:

- ◆ Absolute priority scheduling (`-aps` | `-apn`)
- ◆ Runtime estimate (`-We` | `-Wen`)
- ◆ Post-execution command (`-Ep` | `-Epn`)
- ◆ User limits (`-ul` | `-uln`)
- ◆ Current working directory (`-cwd` | `-cwn`)

- p** Only displays information about pending jobs.
- r** Only displays information about running jobs.
- s** Only displays information about suspended jobs.
- t** Displays job events chronologically.
- w** Wide format. Displays the information in a wide format.

#### **-C *start\_time,end\_time***

Only displays jobs that completed or exited during the specified time interval. Specify the span of time for which you want to display the history. If you do not specify a start time, the start time is assumed to be the time of the first occurrence. If you do not specify an end time, the end time is assumed to be now. If you do not specify an end time, the end time is assumed to be now.

Specify the times in the format "yyyy/mm/dd/HH:MM". Do not specify spaces in the time interval string.

The time interval can be specified in many ways. For more specific syntax and examples of time formats, see TIME INTERVAL FORMAT.

#### **-D *start\_time,end\_time***

Only displays jobs dispatched during the specified time interval. Specify the span of time for which you want to display the history. If you do not specify a start time, the start time is assumed to be the time of the first occurrence. If you do not specify an end time, the end time is assumed to be now. If you do not specify an end time, the end time is assumed to be now.

Specify the times in the format "yyyy/mm/dd/HH:MM". Do not specify spaces in the time interval string.

The time interval can be specified in many ways. For more specific syntax and examples of time formats, see TIME INTERVAL FORMAT.

#### **-S *start\_time,end\_time***

## Options

Only displays information about jobs submitted during the specified time interval. Specify the span of time for which you want to display the history. If you do not specify a start time, the start time is assumed to be the time of the first occurrence. If you do not specify an end time, the end time is assumed to be now. If you do not specify an end time, the end time is assumed to be now.

Specify the times in the format "yyyy/mm/dd/HH:MM". Do not specify spaces in the time interval string.

The time interval can be specified in many ways. For more specific syntax and examples of time formats, see TIME INTERVAL FORMAT.

### **-T start\_time,end\_time**

Used together with -t.

Only displays information about job events within the specified time interval. Specify the span of time for which you want to display the history. If you do not specify a start time, the start time is assumed to be the time of the first occurrence. If you do not specify an end time, the end time is assumed to be now. If you do not specify an end time, the end time is assumed to be now.

Specify the times in the format yyyy/mm/dd/HH:MM. Do not specify spaces in the time interval string.

The time interval can be specified in many ways. For more specific syntax and examples of time formats, see [Time Interval Format](#) on page 52.

### **-f logfile\_name** Searches the specified event log. Specify either an absolute or a relative path.

Useful for analysis directly on the file.

The specified file path can contain up to 4094 characters for UNIX, or up to 255 characters for Windows.

### **-J job\_name** Only displays the jobs that have the specified job name.

The specified job name can contain up to 4094 characters for UNIX, or up to 255 characters for Windows.

### **-Lp ls\_project\_name** Only displays information about jobs belonging to the specified License Scheduler project.

### **-m host\_name** Only displays jobs dispatched to the specified host.

### **-n number\_logfiles | -n 0**

Searches the specified number of event logs, starting with the current event log and working through the most recent consecutively numbered logs. The maximum number of logs you can search is 100. Specify 0 to specify all the event log files in \$(LSB\_SHAREDIR)/cluster\_name/logdir (up to a maximum of 100 files).

If you delete a file, you break the consecutive numbering, and older files will be inaccessible to bhist.

For example, if you specify 3, LSF searches lsb.events, lsb.events.1, and lsb.events.2. If you specify 4, LSF searches lsb.events, lsb.events.1, lsb.events.2, and lsb.events.3. However, if lsb.events.2 is missing, both searches will include only lsb.events and lsb.events.1.

### **-N host\_name | -N host\_model | -N cpu\_factor**

Normalizes CPU time by the specified CPU factor, or by the CPU factor of the specified host or host model.

If you use `bhist` directly on an event log, you must specify a CPU factor.

Use `lsinfo` to get host model and CPU factor information.

**-P *project\_name*** Only displays information about jobs belonging to the specified project.

**-q *queue\_name*** Only displays information about jobs submitted to the specified queue.

**-u *user\_name* | -u all** Displays information about jobs submitted by the specified user, or by all users if the keyword `all` is specified. To specify a Windows user account, include the domain name in uppercase letters and use a single backslash (`DOMAIN_NAME\user_name`) in a Windows command line or a double backslash (`DOMAIN_NAME\\user_name`) in a UNIX command line.

***job\_ID* | "*job\_ID*[*index*]"**

Searches all event log files and only displays information about the specified jobs. If you specify a job array, displays all elements chronologically.

This option overrides all other options except `-J`, `-N`, `-h`, and `-v`. When it is used with `-J`, only those jobs listed here that have the specified job name are displayed.

**-h** Prints command usage to `stderr` and exits.

**-v** Prints LSF release version to `stderr` and exits.

## Output

### Default format

Statistics of the amount of time that a job has spent in various states:

**PEND** The total waiting time excluding user suspended time before the job is dispatched.

**PSUSP** The total user suspended time of a pending job.

**RUN** The total run time of the job.

**USUSP** The total user suspended time after the job is dispatched.

**SSUSP** The total system suspended time after the job is dispatched.

**UNKWN** The total unknown time of the job (job status becomes unknown if `sbatchd` on the execution host is temporarily unreachable).

**TOTAL** The total time that the job has spent in all states; for a finished job, it is the turnaround time (that is, the time interval from job submission to job completion).

### Long format (-l)

The `-l` option displays a long format listing with the following additional fields:

**Project** The project the job was submitted from.

**Application Profile** The application profile the job was submitted to.

Files

## Command

The job command.

Detailed history includes job group modification, the date and time the job was forwarded and the name of the cluster to which the job was forwarded.

The displayed job command can contain up to 4094 characters for UNIX, or up to 255 characters for Windows.

## Files

Reads `lsb.events`

## See also

`lsb.events`, [bgadd](#), [bgdel](#), [bjgroup](#), [bsub](#), [bjobs](#), [lsinfo](#)

## Time Interval Format

You use the time interval to define a start and end time for collecting the data to be retrieved and displayed. While you can specify both a start and an end time, you can also let one of the values default. You can specify either of the times as an absolute time, by specifying the date or time, or you can specify them relative to the current time.

Specify the time interval as follows:

*start\_time,end\_time*|*start\_time*,|*end\_time*|*start\_time*

Specify *start\_time* or *end\_time* in the following format:

[*year/*][*month/*][*day*][/*hour:minute*|/*hour*:]||*.-relative\_int*

Where:

- ◆ *year* is a four-digit number representing the calendar year.
- ◆ *month* is a number from 1 to 12, where 1 is January and 12 is December.
- ◆ *day* is a number from 1 to 31, representing the day of the month.
- ◆ *hour* is an integer from 0 to 23, representing the hour of the day on a 24-hour clock.
- ◆ *minute* is an integer from 0 to 59, representing the minute of the hour.
- ◆ *.* (period) represents the current month/day/hour:minute.
- ◆ *.-relative\_int* is a number, from 1 to 31, specifying a relative start or end time prior to now.

### **start\_time,end\_time**

Specifies both the start and end times of the interval.

### **start\_time,**

Specifies a start time, and lets the end time default to now.

### **,end\_time**

Specifies to start with the first logged occurrence, and end at the time specified.

### **start\_time**

Starts at the beginning of the most specific time period specified, and ends at the maximum value of the time period specified. For example, `2/` specifies the month of February—start February 1 at 00:00 a.m. and end at the last possible minute in February: February 28th at midnight.

## Absolute Time Examples

Assume the current time is May 9 17:06 2008:

`1,8` = May 1 00:00 2008 to May 8 23:59 2008

`,4` = the time of the first occurrence to May 4 23:59 2008

`6` = May 6 00:00 2008 to May 6 23:59 2008

`2/` = Feb 1 00:00 2008 to Feb 28 23:59 2008

`/12:` = May 9 12:00 2008 to May 9 12:59 2008

`2/1` = Feb 1 00:00 2008 to Feb 1 23:59 2008

`2/1,` = Feb 1 00:00 to the current time

`,.` = the time of the first occurrence to the current time

`,2/10:` = the time of the first occurrence to May 2 10:59 2008

`2001/12/31,2008/5/1` = from Dec 31, 2001 00:00:00 to May 1st 2008 23:59:59

## Relative Time Examples

`.-9,` = April 30 17:06 2008 to the current time

`,.-2/` = the time of the first occurrence to Mar 7 17:06 2008

`.-9,.-2` = nine days ago to two days ago (April 30, 2008 17:06 to May 7, 2008 17:06)

# bhosts

displays hosts and their static and dynamic resources

## Synopsis

```
bhosts [-e | -l | -w] [-x] [-X] [-R "res_req"]
      [host_name | host_group] ...
bhosts [-e | -l | -w] [-X] [-R "res_req"] [cluster_name]
bhosts [-e ] -s [shared_resource_name ...]
bhosts [-h | -V]
```

## Description

By default, returns the following information about all hosts: host name, host status, job state statistics, and job slot limits.

`bhosts` displays output for condensed host groups. These host groups are defined by `CONDENSE` in the `HostGroup` section of `lsb.hosts`. These host groups are displayed as a single entry with the name as defined by `GROUP_NAME` in the `HostGroup` section of `lsb.hosts`.

The `-l` and `-X` options display uncondensed output.

The `-s` option displays information about the numeric shared resources and their associated hosts.

With MultiCluster, displays the information about hosts available to the local cluster. Use `-e` to view information about exported hosts.

## Options

- e** MultiCluster only. Displays information about resources that have been exported to another cluster.
- l** Displays host information in a (long) multi-line format. In addition to the default fields, displays information about the CPU factor, the current load, and the load thresholds.  
Also displays information about the dispatch windows.  
If you specified an administrator comment with the `-C` option of the host control commands `hclose` or `hopen`, `-l` displays the comment text.
- w** Displays host information in wide format. Fields are displayed without truncation. For condensed host groups, the `-w` option displays the overall status and the number of hosts with the `ok`, `unavail`, `unreach`, and `busy` status in the following format:  
*host\_group\_status num\_ok/num\_unavail/num\_unreach/num\_busy*  
where
  - ◆ *host\_group\_status* is the overall status of the host group. If a single host in the host group is `ok`, the overall status is also `ok`.
  - ◆ *num\_ok*, *num\_unavail*, *num\_unreach*, and *num\_busy* are the number of hosts that are `ok`, `unavail`, `unreach`, and `busy`, respectively.

For example, if there are five `ok`, two `unavail`, one `unreach`, and three `busy` hosts in a condensed host group `hg1`, its status is displayed as the following:

```
hg1 ok 5/2/1/3
```

If any hosts in the host group are closed, the status for the host group is displayed as `closed`, with no status for the other states:

```
hg1 closed
```

- x Display hosts whose job exit rate has exceeded the threshold configured by `EXIT_RATE` in `lsb.hosts` for longer than `JOB_EXIT_RATE_DURATION` configured in `lsb.params`, and are still high. By default, these hosts will be closed the next time LSF checks host exceptions and invokes `eadmin`.

Use with the `-l` option to show detailed information about host exceptions.

If no hosts exceed the job exit rate, `bhosts -x` displays:

```
There is no exceptional host found
```

- X Displays uncondensed output for host groups.

- R "*res\_req*" Only displays information about hosts that satisfy the resource requirement expression. For more information about resource requirements, see `lsfintro(1)`. The size of the resource requirement string is limited to 512 bytes.

LSF supports ordering of resource requirements on all load indices, including external load indices, either static or dynamic.

#### -s [*shared\_resource\_name ...*]

Displays information about the specified shared resources. The resources must have numeric values. Returns the following information: the resource names, the total and reserved amounts, and the resource locations. If no shared resources are specified, displays information about all numeric shared resources.

When `LOCAL_TO` is configured for a license feature in `lsf.licensescheduler`, `bhosts -s` shows different resource information depending on the cluster locality of the features. For example:

From `clusterA`:

```
bhosts -s
```

RESOURCE	TOTAL	RESERVED	LOCATION
hspice	36.0	0.0	host1

From `clusterB` in `siteB`:

```
bhosts -s
```

RESOURCE	TOTAL	RESERVED	LOCATION
hspice	76.0	0.0	host2

#### *host\_name ... | host\_group ...*

Only displays information about the specified hosts. Do not use quotes when specifying multiple hosts.

For host groups, the names of the hosts belonging to the group are displayed instead of the name of the host group. Do not use quotes when specifying multiple host groups.

- cluster\_name* MultiCluster only. Displays information about hosts in the specified cluster.

## Output

- h** Prints command usage to `stderr` and exits.
- v** Prints LSF release version to `stderr` and exits.

## Output

### Host-Based Default

Displays the following fields:

#### HOST\_NAME

The name of the host. If a host has batch jobs running and the host is removed from the configuration, the host name will be displayed as `lost_and_found`.

For condensed host groups, this is the name of host group.

#### STATUS

With MultiCluster, not shown for fully exported hosts.

The current status of the host and the `sbatchd` daemon. Batch jobs can only be dispatched to hosts with an `ok` status. The possible values for host status are as follows:

##### **ok**

The host is available to accept batch jobs.

For condensed host groups, if a single host in the host group is `ok`, the overall status is also shown as `ok`.

If any host in the host group is not `ok`, `bhosts` displays the first host status it encounters as the overall status for the condensed host group. Use `bhosts -X` to see the status of individual hosts in the host group.

##### **unavail**

The host is down, or LIM and `sbatchd` on the host are unreachable.

##### **unreach**

LIM on the host is running but `sbatchd` is unreachable.

##### **closed**

The host is not allowed to accept any remote batch jobs. There are several reasons for the host to be closed (see Host-Based -l Options).

##### **unlicensed**

The host does not have a valid LSF license.

#### JL/U

With MultiCluster, not shown for fully exported hosts.

The maximum number of job slots that the host can process on a per user basis. If a dash (-) is displayed, there is no limit.

For condensed host groups, this is the total number of job slots that all hosts in the host group can process on a per user basis.

The host will not allocate more than JL/U job slots for one user at the same time. These job slots are used by running jobs, as well as by suspended or pending jobs that have slots reserved for them.

For preemptive scheduling, the accounting is different. These job slots are used by running jobs and by pending jobs that have slots reserved for them (see the description of PREEMPTIVE in `lsb.queues(5)` and JL/U in `lsb.hosts(5)`).

## MAX

The maximum number of job slots available. If a dash (-) is displayed, there is no limit.

For condensed host groups, this is the total maximum number of job slots available in all hosts in the host group.

These job slots are used by running jobs, as well as by suspended or pending jobs that have slots reserved for them.

If preemptive scheduling is used, suspended jobs are not counted (see the description of PREEMPTIVE in `lsb.queues(5)` and MXJ in `lsb.hosts(5)`).

A host does not always have to allocate this many job slots if there are waiting jobs; the host must also satisfy its configured load conditions to accept more jobs.

## NJOBS

The number of job slots used by jobs dispatched to the host. This includes running, suspended, and chunk jobs.

For condensed host groups, this is the total number of job slots used by jobs dispatched to any host in the host group.

## RUN

The number of job slots used by jobs running on the host.

For condensed host groups, this is the total number of job slots used by jobs running on any host in the host group.

## SSUSP

The number of job slots used by system suspended jobs on the host.

For condensed host groups, this is the total number of job slots used by system suspended jobs on any host in the host group.

## USUSP

The number of job slots used by user suspended jobs on the host. Jobs can be suspended by the user or by the LSF administrator.

For condensed host groups, this is the total number of job slots used by user suspended jobs on any host in the host group.

## RSV

The number of job slots used by pending jobs that have jobs slots reserved on the host.

For condensed host groups, this is the total number of job slots used by pending jobs that have job slots reserved on any host in the host group.

## Host-Based -l Option

In addition to the above fields, the `-l` option also displays the following:

### loadSched, loadStop

The scheduling and suspending thresholds for the host. If a threshold is not defined, the threshold from the queue definition applies. If both the host and the queue define a threshold for a load index, the most restrictive threshold is used.

The migration threshold is the time that a job dispatched to this host can remain suspended by the system before LSF attempts to migrate the job to another host.

## Output

If the host's operating system supports checkpoint copy, this is indicated here. With checkpoint copy, the operating system automatically copies all open files to the checkpoint directory when a process is checkpointed. Checkpoint copy is currently supported only on Cray systems.

## STATUS

The long format shown by the `-l` option gives the possible reasons for a host to be closed:

### **closed\_Adm**

The host is closed by the LSF administrator or `root` (see `badmin(8)`). No job can be dispatched to the host, but jobs that are executing on the host will not be affected.

### **closed\_Lock**

The host is locked by the LSF administrator or `root` (see `lsadmin(8)`). All batch jobs on the host are suspended by LSF.

### **closed\_Wind**

The host is closed by its dispatch windows, which are defined in the configuration file `lsb.hosts(5)`. Jobs already started are not affected by the dispatch windows.

### **closed\_Full**

The configured maximum number of batch job slots on the host has been reached (see `MAX` field below).

### **closed\_Excl**

The host is currently running an exclusive job.

### **closed\_Busy**

The host is overloaded, because some load indices go beyond the configured thresholds (see `lsb.hosts(5)`). The displayed thresholds that cause the host to be busy are preceded by an asterisk (\*).

### **closed\_LIM**

LIM on the host is unreachable, but `sbatchd` is `ok`.

### **closed\_EGO**

For EGO-enabled SLA scheduling, host is closed because it has not been allocated by EGO to run LSF jobs. Hosts allocated from EGO display status `ok`.

## CPUF

Displays the CPU normalization factor of the host (see `lshosts(1)`).

## DISPATCH\_WINDOW

Displays the dispatch windows for each host. Dispatch windows are the time windows during the week when batch jobs can be run on each host. Jobs already started are not affected by the dispatch windows. When the dispatch windows close, jobs are not suspended. Jobs already running continue to run, but no new jobs are started until the windows reopen. The default for the dispatch window is no restriction or always open (that is, twenty-four hours a day and seven days a week). For the dispatch window specification, see the description for the `DISPATCH_WINDOWS` keyword under the `-l` option in `bqueues(1)`.

## CURRENT\_LOAD

Displays the total and reserved host load.

### Reserved

You specify reserved resources by using `bsub -R` (see `lsfintro(1)`). These resources are reserved by jobs running on the host.

### Total

The total load has different meanings depending on whether the load index is increasing or decreasing.

For increasing load indices, such as run queue lengths, CPU utilization, paging activity, logins, and disk I/O, the total load is the consumed plus the reserved amount. The total load is calculated as the sum of the current load and the reserved load. The current load is the load seen by `lsload(1)`.

For decreasing load indices, such as available memory, idle time, available swap space, and available space in `tmp`, the total load is the available amount. The total load is the difference between the current load and the reserved load. This difference is the available resource as seen by `lsload(1)`.

**LOAD THRESHOLD** Displays the scheduling threshold `loadSched` and the suspending threshold `loadStop`. Also displays the migration threshold if defined and the checkpoint support if the host supports checkpointing.

The format for the thresholds is the same as for batch job queues (see `bqueues(1)` and `lsb.queues(5)`). For an explanation of the thresholds and load indices, see the description for the "QUEUE SCHEDULING PARAMETERS" keyword under the `-l` option in `bqueues(1)`.

### THRESHOLD AND LOAD USED FOR EXCEPTIONS

Displays the configured threshold of `EXIT_RATE` for the host and its current load value for host exceptions.

### ADMIN ACTION COMMENT

If the LSF administrator specified an administrator comment with the `-C` option of the `badmin` host control commands `hclose` or `hopen`, the comment text is displayed.

### Resource-Based -s Option

The `-s` option displays the following: the amounts used for scheduling, the amounts reserved, and the associated hosts for the shared resources. Only shared resources with numeric values are displayed. See `lim(8)`, and `lsf.cluster(5)` on how to configure shared resources.

The following fields are displayed:

<b>RESOURCE</b>	The name of the resource.
<b>TOTAL</b>	The total amount free of a shared resource used for scheduling.
<b>RESERVED</b>	The amount reserved by jobs. You specify the reserved resource using <code>bsub -R</code> (see <code>lsfintro(1)</code> ).
<b>LOCATION</b>	The hosts that are associated with the shared resource.

Files

## Files

Reads `lsb.hosts`.

## See Also

[lsb.hosts\(5\)](#), [bqueues\(1\)](#), [lsfintro\(1\)](#), [lshosts\(1\)](#), [badmin\(8\)](#), [lsadmin\(8\)](#)

# bhpart

displays information about host partitions

## Synopsis

```
bhpart [-r] [host_partition_name ...]
```

```
bhpart [-h | -V]
```

## Description

By default, displays information about all host partitions. Host partitions are used to configure host-partition fairshare scheduling.

## Options

**-r** Displays the entire information tree associated with the host partition recursively.

***host\_partition\_name* ...**

Displays information about the specified host partitions only.

**-h** Prints command usage to `stderr` and exits.

**-v** Prints LSF release version to `stderr` and exits.

## Output

The following fields are displayed for each host partition:

### HOST\_PARTITION\_NAME

Name of the host partition.

### HOSTS

Hosts or host groups that are members of the host partition. The name of a host group is appended by a slash (/) (see `bmgroup(1)`).

### USER/GROUP

Name of users or user groups who have access to the host partition (see `bugroup(1)`).

### SHARES

Number of shares of resources assigned to each user or user group in this host partition, as configured in the file `lsb.hosts`. The shares affect dynamic user priority for when fairshare scheduling is configured at the host level.

### PRIORITY

Dynamic user priority for the user or user group. Larger values represent higher priorities. Jobs belonging to the user or user group with the highest priority are considered first for dispatch.

In general, users or user groups with larger SHARES, fewer STARTED and RESERVED, and a lower CPU\_TIME and RUN\_TIME will have higher PRIORITY.

Files

## STARTED

Number of job slots used by running or suspended jobs owned by users or user groups in the host partition.

## RESERVED

Number of job slots reserved by the jobs owned by users or user groups in the host partition.

## CPU\_TIME

Cumulative CPU time used by jobs of users or user groups executed in the host partition. Measured in seconds, to one decimal place.

LSF calculates the cumulative CPU time using the actual (not normalized) CPU time and a decay factor such that 1 hour of recently-used CPU time decays to 0.1 hours after an interval of time specified by HIST\_HOURS in `lsb.params` (5 hours by default).

## RUN\_TIME

Wall-clock run time plus historical run time of jobs of users or user groups that are executed in the host partition. Measured in seconds.

LSF calculates the historical run time using the actual run time of finished jobs and a decay factor such that 1 hour of recently-used run time decays to 0.1 hours after an interval of time specified by HIST\_HOURS in `lsb.params` (5 hours by default). Wall-clock run time is the run time of running jobs.

## Files

Reads `lsb.hosts`.

## See Also

[bugroup\(1\)](#), [bmgroup\(1\)](#), [lsb.hosts\(5\)](#)

# bjgroup

displays information about job groups

## Synopsis

```
bjgroup [-N] [-s [group_name]]
```

```
bjgroup [-h | -V]
```

## Description

Displays job group information.

## Options

**-s** Sorts job groups by group hierarchy.

For example, for job groups named /A, /A/B, /X and /X/Y, **bjgroup** without **-s** displays:

```
bjgroup
```

GROUP_NAME	NJOBS	PEND	RUN	SSUSP	USUSP	FINISH	SLA	JLIMIT	OWNER
/A	0	0	0	0	0	0	( )	0/10	user1
/X	0	0	0	0	0	0	( )	0/-	user2
/A/B	0	0	0	0	0	0	( )	0/5	user1
/X/Y	0	0	0	0	0	0	( )	0/5	user2

For the same job groups, **bjgroup -s** displays:

```
bjgroup -s
```

GROUP_NAME	NJOBS	PEND	RUN	SSUSP	USUSP	FINISH	SLA	JLIMIT	OWNER
/A	0	0	0	0	0	0	( )	0/10	user1
/A/B	0	0	0	0	0	0	( )	0/5	user1
/X	0	0	0	0	0	0	( )	0/-	user2
/X/Y	0	0	0	0	0	0	( )	0/5	user2

Specify a job group name to show the hierarchy of a single job group:

```
bjgroup -s /X
```

GROUP_NAME	NJOBS	PEND	RUN	SSUSP	USUSP	FINISH	SLA	JLIMIT	OWNER
/X	25	0	25	0	0	0	puccini	25/100	user1
/X/Y	20	0	20	0	0	0	puccini	20/30	user1
/X/Z	5	0	5	0	0	0	puccini	5/10	user2

Specify a job group name with a trailing slash character (/) to show only the root job group:

```
bjgroup -s /X/
```

GROUP_NAME	NJOBS	PEND	RUN	SSUSP	USUSP	FINISH	SLA	JLIMIT	OWNER
/X	25	0	25	0	0	0	puccini	25/100	user1

## Default output

- N** Displays job group information by job slots instead of number of jobs. NSLOTS, PEND, RUN, SSUSP, USUSP, RSV are all counted in slots rather than number of jobs:

```
bjgroup -N
```

GROUP_NAME	NSLOTS	PEND	RUN	SSUSP	USUSP	RSV	SLA	OWNER
/X	25	0	25	0	0	0	puccini	user1
/A/B	20	0	20	0	0	0	wagner	batch

- N** by itself shows job slot info for all job groups, and can combine with **-s** to sort the job groups by hierarchy:

```
bjgroup -N -s
```

GROUP_NAME	NSLOTS	PEND	RUN	SSUSP	USUSP	RSV	SLA	OWNER
/A	0	0	0	0	0	0	wagner	batch
/A/B	0	0	0	0	0	0	wagner	user1
/X	25	0	25	0	0	0	puccini	user1
/X/Y	20	0	20	0	0	0	puccini	batch
/X/Z	5	0	5	0	0	0	puccini	batch

- h** Prints command usage to `stderr` and exits.
- v** Prints LSF release version to `stderr` and exits.

## Default output

A list of job groups is displayed with the following fields:

### GROUP\_NAME

The name of the job group.

### NJOBS

The current number of jobs in the job group. A parallel job is counted as 1 job, regardless of the number of job slots it will use.

### PEND

The number of pending jobs in the job group.

### RUN

The number of running jobs in the job group.

### SSUSP

The number of system-suspended jobs in the job group.

### USUSP

The number of user-suspended jobs in the job group.

### FINISH

The number of jobs in the specified job group in EXITED or DONE state.

## SLA

The name of the service class that the job group is attached to with `bgadd -sla service_class_name`. If the job group is not attached to any service class, empty parentheses ( ) are displayed in the SLA name column.

## JLIMIT

The job group limit set by `bgadd -L` or `bgmod -L`. Job groups that have no configured limits or no limit usage are indicated by a dash (-). Job group limits are displayed in a USED/LIMIT format. For example, if a limit of 5 jobs is configured and 1 job is started, `bjgroup` displays the job limit under JLIMIT as 1/5.

## OWNER

The job group owner.

## Example

`bjgroup`

GROUP_NAME	NJOBS	PEND	RUN	SSUSP	USUSP	FINISH	SLA	JLIMIT	OWNER
/fund1_grp	5	4	0	1	0	0	Venezia	1/5	user1
/fund2_grp	11	2	5	0	0	4	Venezia	5/5	user1
/bond_grp	2	2	0	0	0	0	Venezia	0/-	user2
/risk_grp	2	1	1	0	0	0	( )	1/-	user2
/admi_grp	4	4	0	0	0	0	( )	0/-	user2

## Job slots (-N) output

NSLOTS, PEND, RUN, SSUSP, USUSP, RSV are all counted in slots rather than number of jobs. A list of job groups is displayed with the following fields:

## GROUP\_NAME

The name of the job group.

## NSLOTS

The total number of job slots held currently by jobs in the job group. This includes pending, running, suspended and reserved job slots. A parallel job that is running on *n* processors is counted as *n* job slots, since it takes *n* job slots in the job group.

## PEND

The number of job slots used by pending jobs in the job group.

## RUN

The number of job slots used by running jobs in the job group.

## SSUSP

The number of job slots used by system-suspended jobs in the job group.

## USUSP

The number of job slots used by user-suspended jobs in the job group.

See Also

## RSV

The number of job slots in the job group that are reserved by LSF for pending jobs.

## SLA

The name of the service class that the job group is attached to with `bgadd -sla service_class_name`. If the job group is not attached to any service class, empty parentheses ( ) are displayed in the SLA name column.

## OWNER

The job group owner.

## Example

```
bjgroup -N
```

GROUP_NAME	NSLOTS	PEND	RUN	SSUSP	USUSP	RSV	SLA	OWNER
/X	25	0	25	0	0	0	puccini	user1
/A/B	20	0	20	0	0	0	wagner	batch

## See Also

[bgadd](#), [bgdel](#), [bgmod](#)

# bjobs

displays information about LSF jobs

## Synopsis

```
bjobs [-A] [-a] [-W] [-w | -l] [-X] [-x]
      [-app application_profile_name] [-g job_group_name]
      [-sla service_class_name] [-J job_name] [-Lp ls_project_name]
      [-m host_name | -m host_group | -m cluster_name]
      [-N host_name | -N host_model | -N cpu_factor]
      [-P project_name] [-q queue_name]
      [-u user_name | -u user_group | -u all | -G user_group]
      job_ID | "job_ID[index_list]" ...

bjobs [-A] [-d] [-p] [-r] [-s] [-W] [-w | -l] [-X] [-x]
      [-app application_profile_name] [-g job_group_name]
      [-sla service_class_name] [-J job_name] [-Lp ls_project_name]
      [-m host_name | -m host_group | -m cluster_name]
      [-N host_name | -N host_model | -N cpu_factor]
      [-P project_name] [-q queue_name]
      [-u user_name | -u user_group | -u all | -G user_group]
      job_ID | "job_ID[index_list]" ...

bjobs [-w | -l | -aps] [-A] [-a] [-d] [-p] [-s] [-r] [-X] [-x]
      [-m host_name] [-q queue_name]
      [-u user_name | -u user_group | -u all | -G user_group]
      [-g job_group] [-sla service_class] [-P project_name]
      [-N host_spec] [-Lp license_project] [-app application_profile]
      [-J name_spec] [job_ID | "job_ID[index_list]" ...]

bjobs [-h | -V]
```

## Description

By default, displays information about your own pending, running and suspended jobs.

`bjobs` displays output for condensed host groups. These host groups are defined by `CONDENSE` in the `HostGroup` section of `lsb.hosts`. These host groups are displayed as a single entry with the name as defined by `GROUP_NAME` in the `HostGroup` section of `lsb.hosts`. The `-l` and `-X` options display uncondensed output.

If you defined `LSB_SHORT_HOSTLIST=1` in `lsf.conf`, parallel jobs running in the same condensed host group are displayed as an abbreviated list.

To display older historical information, use `bhist`.

## Options

- A** Displays summarized information about job arrays. If you specify job arrays with the job array ID, and also specify `-A`, do not include the index list with the job array ID.  
You can use `-w` to show the full array specification, if necessary.
- a** Displays information about jobs in all states, including finished jobs that finished recently, within an interval specified by `CLEAN_PERIOD` in `lsb.params` (the default period is 1 hour).

Use `-a` with `-x` option to display all jobs that have triggered a job exception (overrun, underrun, idle).

**-aps** Displays absolute priority scheduling (APS) information for pending jobs in a queue with `APS_PRIORITY` enabled. The APS value is calculated based on the current scheduling cycle, so jobs are not guaranteed to be dispatched in this order. Pending jobs are ordered by APS value. Jobs with system APS values are listed first, from highest to lowest APS value. Jobs with calculated APS values are listed next ordered from high to low value. Finally, jobs not in an APS queue are listed. Jobs with equal APS values are listed in order of submission time. APS values of jobs not in an APS queue are shown with a dash (-).

If queues are configured with the same priority, `bjobs -aps` may not show jobs in the correct expected dispatch order. Jobs may be dispatched in the order the queues are configured in `lsb.queues`. You should avoid configuring queues with the same priority.

**-d** Displays information about jobs that finished recently, within an interval specified by `CLEAN_PERIOD` in `lsb.params` (the default period is 1 hour).

**-l** Long format. Displays detailed information for each job in a multiline format.

The `-l` option displays the following additional information: project name, job command, current working directory on the submission host, pending and suspending reasons, job status, resource usage, resource usage limits information, runtime resource usage information on the execution hosts.

Use `bjobs -A -l` to display detailed information for job arrays including job array job limit (`%job_limit`) if set.

If `JOB_IDLE` is configured in the queue, use `bjobs -l` to display job idle exception information.

If you submitted your job with the `-U` option to use advance reservations created with the `brsvadd` command, `bjobs -l` shows the reservation ID used by the job.

If `LSF_HPC_EXTENSIONS="SHORT_PIDLIST"` is specified in `lsf.conf`, the output from `bjobs` is shortened to display only the first PID and a count of the process group IDs (PGIDs) and process IDs for the job. Without `SHORT_PIDLIST`, all of the process IDs (PIDs) for a job are displayed.

If you submitted a job with multiple resource requirement strings using the `bsub -R` option for the order, same, rusage, and select sections, `bjobs -l` displays a single, merged resource requirement string for those sections, as if they were submitted using a single `-R`.

If you submitted a job using the `OR (|)` expression to specify alternative resources, this option displays the `Execution rusage` string with which the job runs.

For jobs submitted to an absolute priority scheduling (APS) queue, `-l` shows the ADMIN factor value and the system APS value if they have been set by the administrator for the job:

**-p** Displays pending jobs, together with the pending reasons that caused each job not to be dispatched during the last dispatch turn. The pending reason shows the number of hosts for that reason, or names the hosts if `-l` is also specified.

With MultiCluster, `-l` shows the names of hosts in the local cluster.

Each pending reason is associated with one or more hosts and it states the cause why these hosts are not allocated to run the job. In situations where the job requests specific hosts (using `bsub -m`), users may see reasons for unrelated hosts also being displayed, together with the reasons associated with the requested hosts.

The life cycle of a pending reason ends after the time indicated by `PEND_REASON_UPDATE_INTERVAL` in `lsb.params`.

When the job slot limit is reached for a job array (`bsub -J "jobArray[indexList]%job_slot_limit"`) the following message is displayed:

```
The job array has reached its job slot limit.
```

- r** Displays running jobs.
- s** Displays suspended jobs, together with the suspending reason that caused each job to become suspended.  
  
The suspending reason may not remain the same while the job stays suspended. For example, a job may have been suspended due to the paging rate, but after the paging rate dropped another load index could prevent the job from being resumed. The suspending reason will be updated according to the load index. The reasons could be as old as the time interval specified by `SBD_SLEEP_TIME` in `lsb.params`. So the reasons shown may not reflect the current load situation.
- W** Provides resource usage information for: `PROJ_NAME`, `CPU_USED`, `MEM`, `SWAP`, `PIDS`, `START_TIME`, `FINISH_TIME`.
- w** Wide format. Displays job information without truncating fields.
- X** Displays uncondensed output for host groups.
- x** Displays unfinished jobs that have triggered a job exception (overrun, underrun, idle). Use with the `-l` option to show the actual exception status. Use with `-a` to display all jobs that have triggered a job exception.

**-app *application\_profile\_name***

Displays information about jobs submitted to the specified application profile. You must specify an existing application profile.

- G *user\_group*** Only displays jobs associated with a user group submitted with `bsub -G` for the specified user group. The `-G` option does not display jobs from subgroups within the specified user group.

The `-G` option cannot be used together with the `-u` option. You can only specify a user group name. The keyword `all` is not supported for `-G`.

- g *job\_group\_name*** Displays information about jobs attached to the job group specified by *job\_group\_name*. For example:

```
bjobs -g /risk_group
JOBID  USER  STAT  QUEUE    FROM_HOST  EXEC_HOST  JOB_NAME  SUBMIT_TIME
113    user1  PEND  normal   hostA      hostA      myjob     Jun 17 16:15
111    user2  RUN   normal   hostA      hostA      myjob     Jun 14 15:13
110    user1  RUN   normal   hostB      hostA      myjob     Jun 12 05:03
104    user3  RUN   normal   hostA      hostC      myjob     Jun 11 13:18
```

Use `-g` with `-sla` to display job groups attached to a service class. Once a job group is attached to a service class, all jobs submitted to that group are subject to the SLA.

## Options

`bjobs -l` with `-g` displays the full path to the group to which a job is attached. For example:

```
bjobs -l -g /risk_group
```

```
Job <101>, User <user1>, Project <default>, Job Group </risk_group>, Status <RUN>, Queue <normal>, Command <myjob>  
Tue Jun 17 16:21:49: Submitted from host <hostA>, CWD </home/user1>;  
Tue Jun 17 16:22:01: Started on <hostA>;  
...
```

**-J *job\_name*** Displays information about the specified jobs or job arrays.

The job name can be up to 4094 characters long for UNIX and Linux or up to 255 characters for Windows.

**-Lp *ls\_project\_name*** Displays jobs that belong to the specified LSF License Scheduler project.

**-m *host\_name ...* | -m *host\_group ...* | -m *cluster\_name ...***

Only displays jobs dispatched to the specified hosts. To see the available hosts, use `bhosts`.

If a host group is specified, displays jobs dispatched to all hosts in the group. To determine the available host groups, use `bmgroup`.

With MultiCluster, displays jobs in the specified cluster. If a remote cluster name is specified, you will see the remote job ID, even if the execution host belongs to the local cluster. To determine the available clusters, use `bclusters`.

**-N *host\_name* | -N *host\_model* | -N *cpu\_factor***

Displays the normalized CPU time consumed by the job. Normalizes using the CPU factor specified, or the CPU factor of the host or host model specified.

**-P *project\_name*** Only displays jobs that belong to the specified project.

**-q *queue\_name*** Only displays jobs in the specified queue.

The command `bqueues` returns a list of queues configured in the system, and information about the configurations of these queues.

In MultiCluster, you cannot specify remote queues.

**-sla *service\_class\_name***

Displays jobs belonging to the specified service class.

`bjobs` also displays information about jobs assigned to a default SLA configured with `ENABLE_DEFAULT_EGO_SLA` in `lsb.params`.

Use `-sla` with `-g` to display job groups attached to a service class. Once a job group is attached to a service class, all jobs submitted to that group are subject to the SLA.

Use `bsla` to display the configuration properties of service classes configured in `lsb.serviceclasses`, the default SLA configured in `lsb.params`, and dynamic information about the state of each service class.

**-u *user\_name...* | -u *user\_group...* | -u all**

Only displays jobs that have been submitted by the specified users or user groups. The keyword `all` specifies all users. To specify a Windows user account, include the domain name in uppercase letters and use a single backslash (`DOMAIN_NAME\user_name`) in a Windows command line or a double backslash (`DOMAIN_NAME\\user_name`) in a UNIX command line.

The `-u` option cannot be used with the `-G` option.

**`job_ID | "job_ID[index]"`**

Displays information about the specified jobs or job arrays.

If you use `-A`, specify job array IDs without the index list.

**-h** Prints command usage to `stderr` and exits.

**-v** Prints LSF release version to `stderr` and exits.

## Output

Pending jobs are displayed in the order in which they will be considered for dispatch. Jobs in higher priority queues are displayed before those in lower priority queues. Pending jobs in the same priority queues are displayed in the order in which they were submitted but this order can be changed by using the commands `btop` or `bbot`. If more than one job is dispatched to a host, the jobs on that host are listed in the order in which they will be considered for scheduling on this host by their queue priorities and dispatch times. Finished jobs are displayed in the order in which they were completed.

## Default Display

A listing of jobs is displayed with the following fields:

**JOBID**

The job ID that LSF assigned to the job.

**USER**

The user who submitted the job.

**STAT**

The current status of the job (see JOB STATUS below).

**QUEUE**

The name of the job queue to which the job belongs. If the queue to which the job belongs has been removed from the configuration, the queue name will be displayed as `lost_and_found`. Use `bhist` to get the original queue name. Jobs in the `lost_and_found` queue remain pending until they are switched with the `bswitch` command into another queue.

In a MultiCluster resource leasing environment, jobs scheduled by the consumer cluster display the remote queue name in the format `queue_name@cluster_name`. By default, this field truncates at 10 characters, so you might not see the cluster name unless you use `-w` or `-l`.

**FROM\_HOST**

The name of the host from which the job was submitted.

With MultiCluster, if the host is in a remote cluster, the cluster name and remote job ID are appended to the host name, in the format `host_name@cluster_name:job_ID`. By default, this field truncates at 11 characters; you might not see the cluster name and job ID unless you use `-w` or `-l`.

## Output

**EXEC\_HOST** The name of one or more hosts on which the job is executing (this field is empty if the job has not been dispatched). If the host on which the job is running has been removed from the configuration, the host name is displayed as `lost_and_found`. Use `bhist` to get the original host name.

If the host is part of a condensed host group, the host name is displayed as the name of the condensed host group.

If you configure a host to belong to more than one condensed host groups using wildcards, `bjobs` can display any of the host groups as execution host name.

**JOB\_NAME** The job name assigned by the user, or the command string assigned by default at job submission with `bsub`. If the job name is too long to fit in this field, then only the latter part of the job name is displayed.

The displayed job name or job command can contain up to 4094 characters for UNIX, or up to 255 characters for Windows.

**SUBMIT\_TIME** The submission time of the job.

## -l output

The `-l` option displays a long format listing with the following additional fields:

**Project** The project the job was submitted from.

**Application Profile** The application profile the job was submitted to.

**Command** The job command.

**CWD** The current working directory on the submission host.

**Post-execute Command** The post-execution command specified at the job-level, by `bsub -Ep`.

**PENDING REASONS** The reason the job is in the `PEND` or `PSUSP` state. The names of the hosts associated with each reason will be displayed when both `-p` and `-l` options are specified.

## SUSPENDING REASONS

The reason the job is in the `USUSP` or `SSUSP` state.

### **loadSched**

The load scheduling thresholds for the job.

### **loadStop**

The load suspending thresholds for the job.

**JOB STATUS** Possible values for the status of a job include:

### **PEND**

The job is pending, that is, it has not yet been started.

### **PSUSP**

The job has been suspended, either by its owner or the LSF administrator, while pending.

#### **RUN**

The job is currently running.

#### **USUSP**

The job has been suspended, either by its owner or the LSF administrator, while running.

#### **SSUSP**

The job has been suspended by LSF. The job has been suspended by LSF due to either of the following two causes:

- ◆ The load conditions on the execution host or hosts have exceeded a threshold according to the `loadStop` vector defined for the host or queue.
- ◆ The run window of the job's queue is closed. See `bqueues(1)`, `bhosts(1)`, and `lsb.queues(5)`.

#### **DONE**

The job has terminated with status of 0.

#### **EXIT**

The job has terminated with a non-zero status – it may have been aborted due to an error in its execution, or killed by its owner or the LSF administrator.

For example, exit code 131 means that the job exceeded a configured resource usage limit and LSF killed the job.

#### **UNKWN**

`mbatchd` has lost contact with the `sbatchd` on the host on which the job runs.

#### **WAIT**

For jobs submitted to a chunk job queue, members of a chunk job that are waiting to run.

#### **ZOMBI**

A job will become ZOMBI if:

- ◆ A non-rerunnable job is killed by `bkill` while the `sbatchd` on the execution host is unreachable and the job is shown as UNKWN.
- ◆ The host on which a rerunnable job is running is unavailable and the job has been requeued by LSF with a new job ID, as if the job were submitted as a new job.
- ◆ After the execution host becomes available, LSF will try to kill the ZOMBI job. Upon successful termination of the ZOMBI job, the job's status will be changed to EXIT.

With MultiCluster, when a job running on a remote execution cluster becomes a ZOMBI job, the execution cluster will treat the job the same way as local ZOMBI jobs. In addition, it notifies the submission cluster that the job is in ZOMBI state and the submission cluster requeues the job.

## **RUNTIME**

Estimated run time for the job, specified by `bsub -We` or `bmod -We`.

**RESOURCE USAGE**

For the MultiCluster job forwarding model, this information is not shown if MultiCluster resource usage updating is disabled.

The values for the current usage of a job include:

**CPU time**

Cumulative total CPU time in seconds of all processes in a job.

**IDLE\_FACTOR**

Job idle information (CPU time/runtime) if JOB\_IDLE is configured in the queue, and the job has triggered an idle exception.

**MEM**

Total resident memory usage of all processes in a job. By default, memory usage is shown in MB. Use LSF\_UNIT\_FOR\_LIMITS in `lsf.conf` to specify a larger unit for display (MB, GB, TB, PB, or EB).

**SWAP**

Total virtual memory usage of all processes in a job. By default, swap space is shown in MB. Use LSF\_UNIT\_FOR\_LIMITS in `lsf.conf` to specify a larger unit for display (MB, GB, TB, PB, or EB).

**NTHREAD**

Number of currently active threads of a job.

**PGID**

Currently active process group ID in a job.

**PIDs**

Currently active processes in a job.

**RESOURCE LIMITS**

The hard resource usage limits that are imposed on the jobs in the queue (see `getrlimit(2)` and `lsb.queues(5)`). These limits are imposed on a per-job and a per-process basis.

The possible per-job resource usage limits are:

- ◆ CPULIMIT
- ◆ PROCLIMIT
- ◆ MEMLIMIT
- ◆ SWAPLIMIT
- ◆ PROCESSLIMIT
- ◆ THREADLIMIT
- ◆ OPENFILELIMIT

The possible UNIX per-process resource usage limits are:

- ◆ RUNLIMIT
- ◆ FILELIMIT
- ◆ DATALIMIT
- ◆ STACKLIMIT
- ◆ CORELIMIT

If a job submitted to the queue has any of these limits specified (see `bsub(1)`), then the lower of the corresponding job limits and queue limits are used for the job.

If no resource limit is specified, the resource is assumed to be unlimited. User shell limits that are unlimited are not displayed.

**EXCEPTION STATUS** Possible values for the exception status of a job include:

**idle**

The job is consuming less CPU time than expected. The job idle factor (CPU time/runtime) is less than the configured `JOB_IDLE` threshold for the queue and a job exception has been triggered.

**overrun**

The job is running longer than the number of minutes specified by the `JOB_OVERRUN` threshold for the queue and a job exception has been triggered.

**underrun**

The job finished sooner than the number of minutes specified by the `JOB_UNDERRUN` threshold for the queue and a job exception has been triggered.

## Job Array Summary Information

If you use `-A`, displays summary information about job arrays. The following fields are displayed:

<b>JOBID</b>	Job ID of the job array.
<b>ARRAY_SPEC</b>	Array specification in the format of <i>name[index]</i> . The array specification may be truncated, use <code>-w</code> option together with <code>-A</code> to show the full array specification.
<b>OWNER</b>	Owner of the job array.
<b>NJOBS</b>	Number of jobs in the job array.
<b>PEND</b>	Number of pending jobs of the job array.
<b>RUN</b>	Number of running jobs of the job array.
<b>DONE</b>	Number of successfully completed jobs of the job array.
<b>EXIT</b>	Number of unsuccessfully completed jobs of the job array.
<b>SSUSP</b>	Number of LSF system suspended jobs of the job array.
<b>USUSP</b>	Number of user suspended jobs of the job array.
<b>PSUSP</b>	Number of held jobs of the job array.

## Examples

```
bjobs -pl
```

Displays detailed information about all pending jobs of the invoker.

```
bjobs -ps
```

## See Also

Display only pending and suspended jobs.

```
bjobs -u all -a
```

Displays all jobs of all users.

```
bjobs -d -q short -m hostA -u user1
```

Displays all the recently finished jobs submitted by `user1` to the queue `short`, and executed on the host `hostA`.

```
bjobs 101 102 203 509
```

Display jobs with job\_ID 101, 102, 203, and 509.

```
bjobs -X 101 102 203 509
```

Display jobs with job ID 101, 102, 203, and 509 as uncondensed output even if these jobs belong to hosts in condensed host groups.

```
bjobs -sla Uclulet
```

Displays all jobs belonging to the service class `Uclulet`.

```
bjobs -app fluent
```

Displays all jobs belonging to the application profile `fluent`.

## See Also

[bsub\(1\)](#), [bkill\(1\)](#), [bhosts\(1\)](#), [bmgrouop\(1\)](#), [bclusters\(1\)](#), [bqueues\(1\)](#), [bhist\(1\)](#), [bresume\(1\)](#), [bsla\(1\)](#), [bstop\(1\)](#), [lsb.params\(5\)](#), [lsb.erviceclasses\(5\)](#), [mbatchd\(8\)](#)

# bkill

sends signals to kill, suspend, or resume unfinished jobs

## Synopsis

```
bkill [-l] [-app application_profile_name] [-g job_group_name]
      [-sla service_class_name] [-J job_name] [-m host_name |
      -m host_group] [-q queue_name] [-r |
      -s signal_value | signal_name] [-u user_name |
      -u user_group | -u all] [job_ID ... | 0 | "job_ID[index]" ...]
bkill [-l] [-b] [-app application_profile_name] [-g job_group_name]
      [-sla service_class_name] [-J job_name] [-m host_name |
      -m host_group] [-q queue_name] [-u user_name |
      -u user_group | -u all] [job_ID ... | 0 | "job_ID[index]" ...]
bkill [-h | -V]
```

## Description

By default, sends a set of signals to kill the specified jobs. On UNIX, SIGINT and SIGTERM are sent to give the job a chance to clean up before termination, then SIGKILL is sent to kill the job. The time interval between sending each signal is defined by the JOB\_TERMINATE\_INTERVAL parameter in `lsb.params(5)`.

By default, kills the last job submitted by the user running the command. You must specify a job ID or `-app`, `-g`, `-J`, `-m`, `-u`, or `-q`. If you specify `-app`, `-g`, `-J`, `-m`, `-u`, or `-q` without a job ID, `bkill` kills the last job submitted by the user running the command. Specify job ID 0 (zero) to kill multiple jobs.

On Windows, job control messages replace the SIGINT and SIGTERM signals (but only customized applications can process them) and the `TerminateProcess()` system call is sent to kill the job.

Exit code 130 is returned when a dispatched job is killed with `bkill`.

Users can only operate on their own jobs. Only `root` and LSF administrators can operate on jobs submitted by other users.

If a signal request fails to reach the job execution host, LSF tries the operation later when the host becomes reachable. LSF retries the most recent signal request.

If a job is running in a queue with `CHUNK_JOB_SIZE` set, `bkill` has the following results depending on job state:

### PEND

Job is removed from chunk (NJOBS -1, PEND -1)

### RUN

All jobs in the chunk are suspended (NRUN -1, NSUSP +1)

### USUSP

Job finishes, next job in the chunk starts if one exists (NJOBS -1, PEND -1, SUSP -1, RUN +1)

## Options

### WAIT

Job finishes (NJOBS-1, PEND -1)

If the job cannot be killed, use `bkill -r` to remove the job from the LSF system without waiting for the job to terminate, and free the resources of the job.

## Options

- o** Kills all the jobs that satisfy other options (`-app`, `-g`, `-m`, `-q`, `-u`, and `-J`).
- b** Kills large numbers of jobs as soon as possible. Local pending jobs are killed immediately and cleaned up as soon as possible, ignoring the time interval specified by `CLEAN_PERIOD` in `lsb.params`. Jobs killed in this manner are not logged to `lsb.acct`.  
  
Other jobs, such as running jobs, are killed as soon as possible and cleaned up normally.  
  
If the `-b` option is used with the `0` subcommand, `bkill` kills all applicable jobs and silently skips the jobs that cannot be killed.  

```
bkill -b 0
```

Operation is in progress

The `-b` option is ignored if used with the `-r` or `-s` options.
- l** Displays the signal names supported by `bkill`. This is a subset of signals supported by `/bin/kill` and is platform-dependent.
- r** Removes a job from the LSF system without waiting for the job to terminate in the operating system.  
  
Sends the same series of signals as `bkill` without `-r`, except that the job is removed from the system immediately, the job is marked as EXIT, and the job resources that LSF monitors are released as soon as LSF receives the first signal.  
  
Also operates on jobs for which a `bkill` command has been issued but which cannot be reached to be acted on by `sbatchd` (jobs in ZOMBI state). If `sbatchd` recovers before the jobs are completely removed, LSF ignores the zombi jobs killed with `bkill -r`.  
  
Use `bkill -r` only on jobs that cannot be killed in the operating system, or on jobs that cannot be otherwise removed using `bkill`.  
  
The `-r` option cannot be used with the `-s` option.

### **-app *application\_profile\_name***

Operates only on jobs associated with the specified application profile. You must specify an existing application profile. If `job_ID` or `0` is not specified, only the most recently submitted qualifying job is operated on.

### **-g *job\_group\_name*** Operates only on jobs in the job group specified by *job\_group\_name*.

Use `-g` with `-sla` to kill jobs in job groups attached to a service class.

`bkill` does not kill jobs in lower level job groups in the path. For example, jobs are attached to job groups `/risk_group` and `/risk_group/consolidate`:

```
bsub -g /risk_group myjob
```

Job <115> is submitted to default queue <normal>.

```
bsub -g /risk_group/consolidate myjob2
Job <116> is submitted to default queue <normal>.
```

The following `bkill` command only kills jobs in `/risk_group`, not the subgroup `/risk_group/consolidate`:

```
bkill -g /risk_group 0
Job <115> is being terminated
bkill -g /risk_group/consolidate 0
Job <116> is being terminated
```

**-J *job\_name*** Operates only on jobs with the specified job name. The `-J` option is ignored if a job ID other than 0 is specified in the `job_ID` option.

**-m *host\_name* | -m *host\_group***

Operates only on jobs dispatched to the specified host or host group.

If `job_ID` is not specified, only the most recently submitted qualifying job is operated on. The `-m` option is ignored if a job ID other than 0 is specified in the `job_ID` option. See `bhosts(1)` and `bmgroup(1)` for more information about hosts and host groups.

**-q *queue\_name*** Operates only on jobs in the specified queue.

If `job_ID` is not specified, only the most recently submitted qualifying job is operated on.

The `-q` option is ignored if a job ID other than 0 is specified in the `job_ID` option.

See `bqueues(1)` for more information about queues.

**-s *signal\_value* | *signal\_name***

Sends the specified signal to specified jobs. You can specify either a name, stripped of the SIG prefix (such as KILL), or a number (such as 9).

Eligible UNIX signal names are listed by `bkill -l`.

The `-s` option cannot be used with the `-r` option.

Use `bkill -s` to suspend and resume jobs by using the appropriate signal instead of using `bstop` or `bresume`. Sending the SIGCONT signal is the same as using `bresume`.

Sending the SIGSTOP signal to sequential jobs or the SIGTSTP to parallel jobs is the same as using `bstop`.

You cannot suspend a job that is already suspended, or resume a job that is not suspended. Using SIGSTOP or SIGTSTP on a job that is in the USUSP state has no effect and using SIGCONT on a job that is not in either the PSUSP or the USUSP state has no effect. See `bjobs(1)` for more information about job states.

**-sla *service\_class\_name***

Operates on jobs belonging to the specified service class.

If `job_ID` is not specified, only the most recently submitted job is operated on.

Use `-sla` with `-g` to kill jobs in job groups attached to a service class.

The `-sla` option is ignored if a job ID other than 0 is specified in the `job_ID` option.

## Examples

Use `bsla` to display the configuration properties of service classes configured in `lsb.serviceclasses`, the default SLA configured with `ENABLE_DEFAULT_EGO_SLA` in `lsb.params`, and dynamic information about the state of each service class.

### **-u *user\_name* | -u *user\_group* | -u all**

Operates only on jobs submitted by the specified user or user group, or by all users if the reserved user name `all` is specified. To specify a Windows user account, include the domain name in uppercase letters and use a single backslash (`DOMAIN_NAME\user_name`) in a Windows command line or a double backslash (`DOMAIN_NAME\\user_name`) in a UNIX command line.

If `job_ID` is not specified, only the most recently submitted qualifying job is operated on. The `-u` option is ignored if a job ID other than 0 is specified in the `job_ID` option.

### ***job\_ID* ... | 0 | "*job\_ID[index]*" ...**

Operates only on jobs that are specified by `job_ID` or "`job_ID[index]`", where "`job_ID[index]`" specifies selected job array elements (see `bjobs(1)`). For job arrays, quotation marks must enclose the job ID and index, and index must be enclosed in square brackets.

Jobs submitted by any user can be specified here without using the `-u` option. If you use the reserved job ID 0, all the jobs that satisfy other options (that is, `-m`, `-q`, `-u` and `-J`) are operated on; all other job IDs are ignored.

The options `-u`, `-q`, `-m` and `-J` have no effect if a job ID other than 0 is specified. Job IDs are returned at job submission time (see `bsub(1)`) and may be obtained with the `bjobs` command (see `bjobs(1)`).

**-h** Prints command usage to `stderr` and exits.

**-v** Prints LSF release version to `stderr` and exits.

## Examples

```
bkill -s 17 -q night
```

Sends signal 17 to the last job that was submitted by the invoker to queue `night`.

```
bkill -q short -u all 0
```

Kills all the jobs that are in the queue `short`.

```
bkill -r 1045
```

Forces the removal of unkillable job 1045.

```
bkill -sla Tofino 0
```

Kill all jobs belonging to the service class named `Tofino`.

```
bkill -g /risk_group 0
```

Kills all jobs in the job group `/risk_group`.

```
bkill -app fluent
```

Kills the most recently submitted job associated with the application profile `fluent` for the current user.

```
bkill -app fluent 0
```

Kills all jobs associated with the application profile `fluent` for the current user.

## See Also

[bsub\(1\)](#), [bjobs\(1\)](#), [bqueues\(1\)](#), [bhosts\(1\)](#), [bresume\(1\)](#), [bapp\(1\)](#), [bsla\(1\)](#), [bstop\(1\)](#),  
[bgadd\(1\)](#), [bgdel\(1\)](#), [bjgroup\(1\)](#), [bparams\(5\)](#), [lsb.serviceclasses\(5\)](#), [mbatchd\(8\)](#),  
[kill\(1\)](#), [signal\(2\)](#)

bladmin

# bladmin

reconfigures the Platform LSF License Scheduler daemon (bld)

## Synopsis

```
bladmin subcommand  
bladmin [-h | -V]
```

## Description

Use this command to reconfigure the License Scheduler daemon (bld).  
You must be a License Scheduler administrator to use this command.

## Subcommand List

```
ckconfig [-v]  
reconfig [host_name ... | all]  
shutdown [host_name ... | all]  
bldebug [-c class_name ...] [-l debug_level] [-f logfile_name] [-o]  
blcdebug [-l debug_level] [-f logfile_name] [-o] collector_name ...  
    | all  
-h  
-V
```

## Options

**ckconfig [-v]** Checks LSF License Scheduler configuration in `LSF_ENVDIR/lsf.licensescheduler` and `lsf.conf`.

By default, `bladmin ckconfig` displays only the result of the configuration file check. If warning errors are found, `bladmin` prompts you to use the `-v` option to display detailed messages.

**-v**

Verbose mode. Displays detailed messages about configuration file checking to `stderr`.

**reconfig [host\_name ... | all]**

Reconfigures License Scheduler.

**shutdown [host\_name ... | all]**

Shuts down License Scheduler.

**blddebug [-c class\_name ...] [-l debug\_level] [-f logfile\_name] [-o]**

Sets the message log level for `bld` to include additional information in log files. You must be `root` or the LSF administrator to use this command.

If the `bladmin blddebug` is used without any options, the following default values are used:

- ◆ `class_name=0` (no additional classes are logged)
- ◆ `debug_level=0` (LOG\_DEBUG level in parameter `LS_LOG_MASK`)
- ◆ `logfile_name=current LSF system log file in the LSF system log file directory, in the format daemon_name.log.host_name`

**-c class\_name ...**

Specifies software classes for which debug messages are to be logged.

Format of `class_name` is the name of a class, or a list of class names separated by spaces and enclosed in quotation marks. Classes are also listed in `lsf.h`.

Valid log classes:

- ◆ `LC_AUTH` - Log authentication messages
- ◆ `LC_COMM` - Log communication messages
- ◆ `LC_FLEX` - Log everything related to `FLEX_STAT` or `FLEX_EXEC` Macrovision APIs
- ◆ `LC_LICENCE` - Log license management messages
- ◆ `LC_PREEMPT` - Log preemption policy messages
- ◆ `LC_TRACE` - Log significant program walk steps
- ◆ `LC_XDR` - Log everything transferred by XDR

Default: 0 (no additional classes are logged)

**-l debug\_level**

Specifies level of detail in debug messages. The higher the number, the more detail that is logged. Higher levels include all lower levels.

Possible values:

0 LOG\_DEBUG level in parameter LS\_LOG\_MASK in `lsf.conf`.

1 LOG\_DEBUG1 level for extended logging. A higher level includes lower logging levels. For example, LOG\_DEBUG3 includes LOG\_DEBUG2 LOG\_DEBUG1, and LOG\_DEBUG levels.

2 LOG\_DEBUG2 level for extended logging. A higher level includes lower logging levels. For example, LOG\_DEBUG3 includes LOG\_DEBUG2 LOG\_DEBUG1, and LOG\_DEBUG levels.

3 LOG\_DEBUG3 level for extended logging. A higher level includes lower logging levels. For example, LOG\_DEBUG3 includes LOG\_DEBUG2, LOG\_DEBUG1, and LOG\_DEBUG levels.

Default: 0 (LOG\_DEBUG level in parameter LS\_LOG\_MASK)

**-f logfile\_name**

Specifies the name of the file where debugging messages are logged. The file name can be a full path. If a file name without a path is specified, the file is saved in the LSF system log directory.

The name of the file has the following format:

*logfile\_name.daemon\_name.log.host\_name*

On UNIX, if the specified path is not valid, the log file is created in the `/tmp` directory.

On Windows, if the specified path is not valid, no log file is created.

Default: current LSF system log file in the LSF system log file directory.

**-o**

Turns off temporary debug settings and resets them to the daemon starting state. The message log level is reset back to the value of LS\_LOG\_MASK and classes are reset to the value of LSB\_DEBUG\_BLD. The log file is also reset back to the default log file.

**blcdebug [-l debug\_level] [-f logfile\_name] [-o] collector\_name | all**

Sets the message log level for `blcollect` to include additional information in log files. You must be `root` or the LSF administrator to use this command.

If the `bladmin blcdebug` is used without any options, the following default values are used:

- ◆ *debug\_level*=0 (LOG\_DEBUG level in parameter LS\_LOG\_MASK)
- ◆ *logfile\_name*=current LSF system log file in the LSF system log file directory, in the format *daemon\_name.log.host\_name*
- ◆ *collector\_name*=default

**-l debug\_level**

Specifies level of detail in debug messages. The higher the number, the more detail that is logged. Higher levels include all lower levels.

Possible values:

0 LOG\_DEBUG level in parameter LS\_LOG\_MASK in `lsf.conf`.

1 LOG\_DEBUG1 level for extended logging. A higher level includes lower logging levels. For example, LOG\_DEBUG3 includes LOG\_DEBUG2 LOG\_DEBUG1, and LOG\_DEBUG levels.

2 LOG\_DEBUG2 level for extended logging. A higher level includes lower logging levels. For example, LOG\_DEBUG3 includes LOG\_DEBUG2 LOG\_DEBUG1, and LOG\_DEBUG levels.

3 LOG\_DEBUG3 level for extended logging. A higher level includes lower logging levels. For example, LOG\_DEBUG3 includes LOG\_DEBUG2, LOG\_DEBUG1, and LOG\_DEBUG levels.

Default: 0 (LOG\_DEBUG level in parameter LS\_LOG\_MASK)

**-f logfile\_name**

Specifies the name of the file where debugging messages are logged. The file name can be a full path. If a file name without a path is specified, the file is saved in the LSF system log directory.

The name of the file has the following format:

*logfile\_name.daemon\_name.log.host\_name*

On UNIX, if the specified path is not valid, the log file is created in the `/tmp` directory.

On Windows, if the specified path is not valid, no log file is created.

Default: current LSF system log file in the LSF system log file directory.

**-o**

Turns off temporary debug settings and resets them to the daemon starting state. The message log level is reset back to the value of LS\_LOG\_MASK and classes are reset to the value of LSB\_DEBUG\_BLD. The log file is also reset back to the default log file.

If a collector name is not specified, default value is to restore the original log mask and log file directory for the `default` collector.

**collector\_name ... | all**

Specifies the collector names separated by blanks. `all` means all the collectors.

**-h** Prints command usage to `stderr` and exits.

**-v** Prints release version to `stderr` and exits.

## See Also

[blhosts](#), [lsf.licensescheduler](#), [lsf.conf](#)

# blaunch

launches parallel tasks on a set of hosts

## Synopsis

```
blaunch [-n] [-u host_file | -z host_name ... | host_name]
        command [argument ...]
blaunch [-h | -V]
```

## Description

**IMPORTANT:** You cannot run `blaunch` directly from the command line.

Most MPI implementations and many distributed applications use `rsh` and `ssh` as their task launching mechanism. The `blaunch` command provides a drop-in replacement for `rsh` and `ssh` as a transparent method for launching parallel applications within LSF.

`blaunch` supports the following core command line options as `rsh` and `ssh`:

- ◆ `rsh host_name command`
- ◆ `ssh host_name command`

All other `rsh` and `ssh` options are silently ignored.

`blaunch` transparently connects directly to the RES/SBD on the remote host, and subsequently creates and tracks the remote tasks, and provides the connection back to LSF. You do not need to insert `pam`, `taskstarter` or any other wrapper.

`blaunch` only works under LSF. It can *only* be used to launch tasks on remote hosts that are part of a job allocation. It *cannot* be used as a standalone command.

`blaunch` is not supported on Windows.

When no host names are specified, LSF allocates all hosts listed in the environment variable `LSB_MCPU_HOSTS`.

## Options

- n** Standard input is taken from `/dev/null`.
- u *host\_file*** Executes the task on all hosts listed in the *host\_file*.  
Specify the path to a file that contains a list of host names. Each host name must listed on a separator line in the host list file.  
This option is exclusive of the `-z` option.
- host\_name*** The name of the host where remote tasks are to be launched.
- z *host\_name* ...** Executes the task on all specified hosts.  
Whereas the host name value for `rsh` and `ssh` is a single host name, you can use the `-z` option to specify a space-delimited list of hosts where tasks are started in parallel.

Specify a list of hosts on which to execute the task. If multiple host names are specified, the host names must be enclosed by quotation marks ( " or ' ) and separated by white space.

This option is exclusive of the `-u` option.

***command*** [*argument ...*]

Specify the command to execute. This must be the last argument on the command line.

- h** Prints command usage to `stderr` and exits.
- v** Prints LSF release version to `stderr` and exits.

## Diagnostics

Exit status is 0 if all commands are executed correctly.

## See Also

`lsb_getalloc(3)`, `lsb_launch(3)`

# blcollect

license information collection daemon

## Synopsis

```
blcollect [-c collector_name ] [-m host_name ...] [-p
license_scheduler_port]
blcollect [-i lmstat_interval | -D lmstat_path]
blcollect [-h | -V]
```

## Description

Periodically collects license usage information from Macrovision FLEXnet. It queries FLEXnet for license usage information from the FLEXnet `lmstat` command, and passes the information to the License Scheduler daemon (`blsd`). The `blcollect` daemon improves performance by allowing you to distribute license information queries on multiple hosts.

By default, license information is collected from FLEXnet on one host. Use `blcollect` to distribute the license collection on multiple hosts.

For each service domain configuration in `lsf.licensescheduler`, specify one name for `blcollect` to use. You can only specify one collector per service domain, but you can specify one collector to serve multiple service domains. You can choose any collector name you want, but must use that exact name when you run `blcollect`.

## Options

- c** Required. Specify the collector name you set in `lsf.licensescheduler`. You must use the collector name (`LIC_COLLECT`) you define in the `ServiceDomain` section of the configuration file.
- m** Required. Specifies a space-separated list of hosts to which license information is sent. The hosts do not need to be running License Scheduler or a FLEXnet. Use fully qualified host names.
- p** Required. Corresponds to the License Scheduler listening port, which is set in `lsf.licensescheduler`. The default value is 9581.
- i *lmstat\_interval*** Optional. The frequency in seconds of the calls that License Scheduler makes to `lmstat` to collect license usage information from FLEXnet. The default interval is 60 seconds.
- D *lmstat\_path*** Optional. Location of the FLEXnet command `lmstat`.
- h** Prints command usage to `stderr` and exits.
- V** Prints release version to `stderr` and exits.

## See Also

`lsf.licensescheduler`

# blhosts

displays the names of all the hosts running the License Scheduler daemon (bld)

## Synopsis

```
blhosts [-h | -V]
```

## Description

Displays a list of hosts running the License Scheduler daemon. This includes the License Scheduler master host and all the candidate License Scheduler hosts running bld.

## Options

- h** Prints command usage to `stderr` and exits.
- V** Prints release version to `stderr` and exits.

## Output

Prints out the names of all the hosts running the License Scheduler daemon (bld).

For example, the following sample output shows the License Scheduler master host and two candidate License Scheduler hosts running bld:

```
bld is running on:  
master: host1.domain1.com  
slave: host2.domain1 host3.domain1
```

## See Also

[blinfo](#), [blstat](#), [bladmin](#)

# blimits

displays information about resource allocation limits of running jobs

## Synopsis

```
blimits [-w] [-n limit_name ...]
        [-m host_name | -m host_group | -m cluster_name ...]
        [-P project_name ...] [-q queue_name ...]
        [-u user_name | -u user_group ...]

blimits -c

blimits -h | -V
```

## Description

Displays current usage of resource allocation limits configured in Limit sections in `lsb.resources`:

- ◆ Configured limit policy name
- ◆ Users (-u option)
- ◆ Queues (-q option)
- ◆ Hosts (-m option)
- ◆ Project names (-P option)
- ◆ Limits (SLOTS, MEM, TMP, SWP, JOBS)
- ◆ Limit configuration (-c option). This is the same as `bresources` with no options.

Resources that have no configured limits or no limit usage are indicated by a dash (-). Limits are displayed in a USED/LIMIT format. For example, if a limit of 10 slots is configured and 3 slots are in use, then `blimits` displays the limit for SLOTS as 3/10.

Note that if there are no jobs running against resource allocation limits, LSF indicates that there is no information to be displayed:

```
No resource usage found.
```

If limits MEM, SWP, or TMP are configured as percentages, both the limit and the amount used are displayed in MB. For example, `lshosts` displays `maxmem` of 249 MB, and MEM is limited to 10% of available memory. If 10 MB out of 25 MB are used, `blimits` displays the limit for MEM as 10/25 (10 MB USED from a 25 MB LIMIT).

Limits are displayed for both the vertical tabular format and the horizontal format for Limit sections. If a vertical format Limit section has no name, `blimits` displays `NONAME $nnn$`  under the NAME column for these limits, where the unnamed limits are numbered in the order the vertical-format Limit sections appear in the `lsb.resources` file.

If a resource consumer is configured as `all`, the limit usage for that consumer is indicated by a dash (-)

PER\_HOST slot limits are not displayed. The `bhosts` command displays these as MXJ limits.

In MultiCluster, `blimits` returns the information about all limits in the local cluster.

Limit names and policies are set up by the LSF administrator. See `lsb.resources(5)` for more information.

## Options

**-c** Displays all resource configurations in `lsb.resources`. This is the same as `bresources` with no options.

**-w** Displays resource allocation limits information in a wide format. Fields are displayed without truncation.

**-n limit\_name ...** Displays resource allocation limits the specified named Limit sections. If a list of limit sections is specified, Limit section names must be separated by spaces and enclosed in quotation marks (") or (').

**-m host\_name | -m host\_group | -m cluster\_name ...**

Displays resource allocation limits for the specified hosts. Do not use quotes when specifying multiple hosts.

To see the available hosts, use `bhosts`.

For host groups:

- ◆ If the limits are configured with HOSTS, the name of the host group is displayed.
- ◆ If the limits are configured with PER\_HOST, the names of the hosts belonging to the group are displayed instead of the name of the host group.

---

**TIP:** PER\_HOST slot limits are not displayed. The `bhosts` command displays these as MXJ limits.

For a list of host groups see `bmgroup(1)`.

In MultiCluster, if a cluster name is specified, displays resource allocation limits in the specified cluster.

**-P project\_name ...** Displays resource allocation limits for the specified projects.

If a list of projects is specified, project names must be separated by spaces and enclosed in quotation marks (") or (').

**-q queue\_name ...** Displays resource allocation limits for the specified queues.

The command `bqueues` returns a list of queues configured in the system, and information about the configurations of these queues.

In MultiCluster, you cannot specify remote queues.

**-u user\_name | -u user\_group ...**

Displays resource allocation limits for the specified users.

If a list of users is specified, user names must be separated by spaces and enclosed in quotation marks (") or ('). You can specify both user names and user IDs in the list of users.

## Output

If a user group is specified, displays the resource allocation limits that include that group in their configuration. For a list of user groups see `bugroup(1)`.

- h** Prints command usage to `stderr` and exits.
- v** Prints LSF release version to `stderr` and exits.

## Output

Configured limits and resource usage for builtin resources (slots, mem, tmp, and swp load indices, and running and suspended job limits) are displayed as INTERNAL RESOURCE LIMITS separately from custom external resources, which are shown as EXTERNAL RESOURCE LIMITS.

## Resource Consumers

`blimits` displays the following fields for resource consumers:

<b>NAME</b>	The name of the limit policy as specified by the Limit section NAME parameter.
<b>USERS</b>	List of user names or user groups on which the displayed limits are enforced, as specified by the Limit section parameters USERS or PER_USER. User group names have a slash (/) added at the end of the group name. See <code>bugroup(1)</code> .
<b>QUEUES</b>	The name of the queue to which the limits apply, as specified by the Limit section parameters QUEUES or PER_QUEUES. If the queue has been removed from the configuration, the queue name is displayed as <code>lost_and_found</code> . Use <code>bhist</code> to get the original queue name. Jobs in the <code>lost_and_found</code> queue remain pending until they are switched with the <code>bswitch</code> command into another queue. In a MultiCluster resource leasing environment, jobs scheduled by the consumer cluster display the remote queue name in the format <code>queue_name@cluster_name</code> . By default, this field truncates at 10 characters, so you might not see the cluster name unless you use <code>-w</code> or <code>-l</code> .
<b>HOSTS</b>	List of hosts and host groups on which the displayed limits are enforced, as specified by the Limit section parameters HOSTS or PER_HOSTS. Host group names have a slash (/) added at the end of the group name. See <code>bmgroup(1)</code> . <hr/> <b>TIP:</b> PER_HOST slot limits are not displayed. The <code>bhosts</code> command displays these as MXJ limits.
<b>PROJECTS</b>	List of project names on which limits are enforced., as specified by the Limit section parameters PROJECTS or PER_PROJECT.

## Resource Limits

`blimits` displays resource allocation limits for the following resources:

<b>SLOTS</b>	Number of slots currently used and maximum number of slots configured for the limit policy, as specified by the Limit section SLOTS parameter.
--------------	------------------------------------------------------------------------------------------------------------------------------------------------

<b>MEM</b>	Amount of memory currently used and maximum configured for the limit policy, as specified by the Limit section MEM parameter.
<b>TMP</b>	Amount of tmp space currently used and maximum amount of tmp space configured for the limit policy, as specified by the Limit section TMP parameter.
<b>SWP</b>	Amount of swap space currently used and maximum amount of swap space configured for the limit policy, as specified by the Limit section SWP parameter.
<b>JOBS</b>	Number of currently running and suspended jobs and the maximum number of jobs configured for the limit policy, as specified by the Limit section JOBS parameter.

## Example

The following command displays limit configuration and dynamic usage information for project proj1:

```
blimits -P proj1
INTERNAL RESOURCE LIMITS:
NAME      USERS      QUEUES      HOSTS      PROJECTS    SLOTS      MEM      TMP      SWP      JOBS
limit1    user1      -           hostA      proj1       2/6        -        -        -        -
NONAME022 -          -           hostB      proj1 proj2      1/3        -        -        -        -

EXTERNAL RESOURCE LIMITS:
NAME      USERS      QUEUES      HOSTS      PROJECTS    tmp1
limit1    user1      -           hostA      proj1      1/1
```

## See Also

[bclusters](#), [bhsts](#), [bhst](#), [bmgroup](#), [bqueues](#), [bugroup](#), [lsb.resources](#)

# blinfo

displays static License Scheduler configuration information

## Synopsis

```
blinfo [-a [-t token_name | "token_name ..."] |
        -A [-t token_name | "token_name ..."] |
        -C [-t token_name | "token_name ..."] | -Lp | -p | -D | -G |
        [-t token_name | "token_name ..."]
blinfo [ -h | -V ]
```

## Description

Displays different license configuration information, depending on the option selected.

By default, displays information about the distribution of licenses managed by License Scheduler.

## Options

- A** When LOCAL\_TO is configured for a feature in `lsf.licensescheduler`, shows the feature allocation by cluster locality.  
You can optionally provide license token names.
- a** Shows all information, including information about non-shared licenses (NON\_SHARED\_DISTRIBUTION) and workload distribution (WORKLOAD\_DISTRIBUTION).  
You can optionally provide license token names.  
`blinfo -a` does not display NON\_SHARED information for hierarchical project group scheduling policies. Use `blinfo -G` to see hierarchical group configuration.
- C** When LOCAL\_TO is configured for a feature in `lsf.licensescheduler`, shows the cluster locality information for the features.  
You can optionally provide license token name.s
- D** Lists the License Scheduler service domains and the corresponding FLEXnet license server hosts.
- G** Lists the hierarchical configuration information.  
If PRIORITY is defined in the ProjectGroup Section of `lsf.licensescheduler`, this option also shows the priorities of each project.
- Lp** Lists the active projects managed by License Scheduler.  
-Lp only displays projects associated with configured features.  
If PRIORITY is defined in the Projects Section of `lsf.licensescheduler`, this option also lists the priorities of each project.
- t *token\_name* | "*token\_name* ..."**  
Only shows information about specified license tokens. Use spaces to separate multiple names, and enclose them in quotation marks.

- p** Displays values of `lsf.licensescheduler` configuration parameters and `lsf.conf` parameters related to License Scheduler. This is useful for troubleshooting.
- h** Prints command usage to `stderr` and exits.
- v** Prints the License Scheduler release version to `stderr` and exits.

## Output

### Default output

Displays the following fields:

<b>FEATURE</b>	The license name. This becomes the license token name. When <code>LOCAL_TO</code> is configured for a feature in <code>lsf.licensescheduler</code> , <code>blinfo</code> shows the cluster locality information for the license features.
<b>SERVICE_DOMAIN</b>	The name of the service domain that provided the license.
<b>TOTAL</b>	The total number of licenses managed by FLEXnet. This number comes from FLEXnet.
<b>DISTRIBUTION</b>	The distribution of the licenses among license projects in the format [ <i>project_name, percentage[/number_licenses_owned]</i> ]. This determines how many licenses a project is entitled to use when there is competition for licenses. The percentage is calculated from the share specified in the configuration file.

### Allocation output (-A)

<b>FEATURE</b>	The license name. This becomes the license token name. When <code>LOCAL_TO</code> is configured for a feature in <code>lsf.licensescheduler</code> , <code>blinfo</code> shows the cluster locality information for the license features.
<b>PROJECT</b>	The License Scheduler project name.
<b>ALLOCATION</b>	The percentage of shares assigned to each cluster for a feature and a project.

### All output (-a)

Same as Default Output with `NON_SHARED_DISTRIBUTION`.

### NON-SHARED\_DISTRIBUTION

This column is displayed directly under `DISTRIBUTION` with the `-a` option. If there are non-shared licenses, then the non-shared license information is output in the following format: [*project\_name, number\_licenses\_non\_shared*]

If there are no non-shared licenses, then the following license information is output - (dash)

## Output

### Cluster locality output (-C)

<b>NAME</b>	The license feature token name. When LOCAL_TO is configured for a feature in <code>lsf.licensescheduler</code> , <code>blinfo</code> shows the cluster locality information for the license features.
<b>FLEX_NAME</b>	The actual FLEXnet feature name—the name used by FLEXnet to identify the type of license. May be different from the the License Scheduler token name if a different FLEX_NAME is specified in <code>lsf.licensescheduler</code> .
<b>CLUSTER_NAME</b>	The name of the cluster the feature is assigned to.
<b>FEATURE</b>	The license feature name. This becomes the license token name. When LOCAL_TO is configured for a feature in <code>lsf.licensescheduler</code> , <code>blinfo</code> shows the cluster locality information for the license features.
<b>SERVICE_DOMAIN</b>	The service domain name.

### Service Domain Output (-D)

<b>SERVICE_DOMAIN</b>	The service domain name.
<b>LIC_SERVERS</b>	Names of FLEXnet license server hosts that belong the to service domain. Each host name is enclosed in parentheses, as shown: <i>(port_number@host_name)</i> Redundant hosts (that share the same FLEXnet license file) are grouped together as shown: <i>(port_number@host_name port_number@host_name port_number@host_name)</i>

### Hierarchical Output (-G)

	The following fields describe the values of their corresponding configuration fields in the <code>ProjectGroup</code> Section of <code>lsf.licensecheduler</code> .
<b>GROUP</b>	The project names in the hierarchical grouping and its relationships. Each entry specifies the name of the hierarchical group and its members. The entry is enclosed in parentheses as shown: <i>(group (member ...))</i>
<b>SHARES</b>	The shares assigned to the hierarchical group member projects.
<b>OWNERSHIP</b>	The number of licenses that each project owns.
<b>LIMITS</b>	The maximum number of licenses that the hierarchical group member project can use at any one time.
<b>NON_SHARED</b>	The number of licenses that the hierarchical group member projects use exclusively.
<b>PRIORITY</b>	The priority of the project if it is different from the default behaviour. A larger number indicates a higher priority.

## Project Output (-Lp)

List of active License Scheduler projects.

-Lp only displays projects associated with configured features.

### PROJECT

The project name.

### PRIORITY

The priority of the project if it is different from the default behaviour. A larger number indicates a higher priority.

## Parameters Output (-p)

### ADMIN

The License Scheduler administrator. Defined in `lsf.licensescheduler`.

### DISTRIBUTION\_POLICY\_VIOLATION\_ACTION

This parameter includes

- ◆ The interval (a multiple of `LM_STAT_INVERVAL` periods) at which License Scheduler checks for distribution policy violations, and
- ◆ The directory path and command that License Scheduler runs when reporting a violation

Defined in `lsf.licensescheduler`.

### EXT\_FILTER\_PORT

TCP listening port used by all external plugins to communicate with License Scheduler hosts. Defined in `lsf.licensescheduler`.

### FLX\_LICENSE\_FILE

Path to the file that contains the license keys `FLEXnet.Ext.Filter` and `FLEXnet.Usage.Snapshot` to enable the FLEXnet APIs. Defined in `lsf.licensescheduler`.

### HOSTS

License Scheduler candidate hosts. Defined in `lsf.licensescheduler`.

### LM\_REMOVE\_INTERVAL

Minimum time a job must have a license checked out before `lmremove` can remove the license. Defined in `lsf.licensescheduler`.

### LM\_STAT\_INTERVAL

Time interval between calls that License Scheduler makes to collect license usage information from FLEXnet license management. Defined in `lsf.licensescheduler`.

### LS\_MAX\_TASKMAN\_SESSIONS

Maximum number of `taskman` jobs that run simultaneously. Defined in `lsf.licensescheduler`.

### LSF\_LIC\_SCHED\_HOSTS

List of hosts that are candidate LSF License Scheduler hosts. Defined in `lsf.conf`.

### LSF\_LIC\_SCHED\_PREEMPT\_QUEUEUE

Specifies whether to requeue or suspend a job whose license is preempted by LSF License Scheduler. Defined in `lsf.conf`.

## Examples

### LSF\_LIC\_SCHED\_PREEMPT\_SLOT\_RELEASE

Specifies whether to release the slot of a job that is suspended when its license is preempted by LSF License Scheduler. Defined in `lsf.conf`.

### LSF\_LIC\_SCHED\_PREEMPT\_STOP

Specifies whether to use job controls to stop a job that is preempted. Defined in `lsf.conf`.

### LSF\_LICENSE\_FILE

Location of the LSF license file, which includes License Scheduler keys. Defined in `lsf.conf`.

## PORT

TCP listening port used by License Scheduler. Defined in `lsf.licensescheduler`.

## Examples

`blinfo -a` displays both `NON_SHARED_DISTRIBUTION` and `WORKLOAD_DISTRIBUTION` information:

```
blinfo -a
FEATURE  SERVICE_DOMAIN  TOTAL  DISTRIBUTION
g1       LS               3      [p1, 50.0%] [p2, 50.0% / 2]
                NON_SHARED_DISTRIBUTION
                [p2, 2]
                WORKLOAD_DISTRIBUTION
                [LSF 66.7%, NON_LSF 33.3%]
```

`blinfo -a` does not display `NON_SHARED_DISTRIBUTION`, if the `NON_SHARED_DISTRIBUTION` is not defined:

```
blinfo -a
FEATURE  SERVICE_DOMAIN  TOTAL  DISTRIBUTION
g1       LS               0      [p1, 50.0%] [p2, 50.0%]
                WORKLOAD_DISTRIBUTION
                [LSF 66.7%, NON_LSF 33.3%]
g2       LS               0      [p1, 50.0%] [p2, 50.0%]
g33      WS               0      [p1, 50.0%] [p2, 50.0%]
```

`blinfo -a` does not display `WORKLOAD_DISTRIBUTION`, if the `WORKLOAD_DISTRIBUTION` is not defined:

```
blinfo -a
FEATURE  SERVICE_DOMAIN  TOTAL  DISTRIBUTION
g1       LS               3      [p1, 50.0%] [p2, 50.0% / 2]
                NON_SHARED_DISTRIBUTION
                [p2, 2]
```

## Files

Reads `lsf.licensescheduler`

## See Also

[blstat](#), [blusers](#)

# blkill

terminates an interactive License Scheduler task

## Synopsis

```
blkill [-t seconds] task_ID  
blkill [-h | -V]
```

## Description

Terminates a running or waiting interactive task in License Scheduler.

Users can kill their own tasks. You must be a License Scheduler administrator to terminate another user's task.

By default, `blkill` notifies the user and waits 30 seconds before killing the task.

## Options

- task\_ID*** Task ID of the task you want to kill.
- t *seconds*** Specify how many seconds to delay before killing the task. A value of 0 means to kill the task immediately (do not give the user any time to save work).
- h** Prints command usage to `stderr` and exits.
- V** Prints License Scheduler release version to `stderr` and exits.

# blparams

displays information about configurable License Scheduler parameters defined in the files `lsf.licensescheduler` and `lsf.conf`

## Synopsis

```
blparams [-h | -V]
```

## Description

Displays the following parameter values:

### ADMIN

The License Scheduler administrator. Defined in `lsf.licensescheduler`.

### DISTRIBUTION\_POLICY\_VIOLATION\_ACTION

This parameter includes

- ◆ The interval (a multiple of `LM_STAT_INVERVAL` periods) at which License Scheduler checks for distribution policy violations, and
- ◆ The directory path and command that License Scheduler runs when reporting a violation

Defined in `lsf.licensescheduler`.

### EXT\_FILTER\_PORT

TCP listening port used by all external plugins to communicate with License Scheduler hosts. Defined in `lsf.licensescheduler`.

### FLX\_LICENSE\_FILE

Path to the file that contains the license keys `FLEXnet.Ext.Filter` and `FLEXnet.Usage.Snapshot` to enable the FLEXnet APIs. Defined in `lsf.licensescheduler`.

### HOSTS

License Scheduler candidate hosts. Defined in `lsf.licensescheduler`.

### LM\_REMOVE\_INTERVAL

Minimum time a job must have a license checked out before `lmremove` can remove the license. Defined in `lsf.licensescheduler`.

### LM\_STAT\_INTERVAL

Time interval between calls that License Scheduler makes to collect license usage information from FLEXnet license management. Defined in `lsf.licensescheduler`.

### LS\_MAX\_TASKMAN\_SESSIONS

Maximum number of `taskman` jobs that run simultaneously. Defined in `lsf.licensescheduler`.

## LSF\_LIC\_SCHED\_HOSTS

List of hosts that are candidate LSF License Scheduler hosts. Defined in `lsf.conf`.

## LSF\_LIC\_SCHED\_PREEMPT\_REQUEUE

Specifies whether to requeue or suspend a job whose license is preempted by LSF License Scheduler. Defined in `lsf.conf`.

## LSF\_LIC\_SCHED\_PREEMPT\_SLOT\_RELEASE

Specifies whether to release the slot of a job that is suspended when its license is preempted by LSF License Scheduler. Defined in `lsf.conf`.

## LSF\_LIC\_SCHED\_PREEMPT\_STOP

Specifies whether to use job controls to stop a job that is preempted. Defined in `lsf.conf`.

## LSF\_LICENSE\_FILE

Location of the LSF license file, which includes License Scheduler keys. Defined in `lsf.licensescheduler`.

## PORT

TCP listening port used by License Scheduler. Defined in `lsf.licensescheduler`.

## Options

- h** Prints command usage to `stderr` and exits.
- v** Prints LSF release version to `stderr` and exits.

## See Also

`lsf.licensescheduler`, `lsf.conf`

# blplugins

displays plugin activity and the check-in, check-out, and deny counters as seen by the License Scheduler for each feature and service domain

## Synopsis

```
blplugins [-h | -V]
```

## Description

Displays the License Scheduler Vendor Plugin Status.

## Options

- h** Prints command usage to `stderr` and exits.
- V** Prints LSF release version to `stderr` and exits.

## Output

### IP

The IP address for each external filter server plugin.

### checkins

The total number of licenses checked in to the license server from the last time the external filter server was to `bld`.

### checkouts

The total number of licenses checked out from the license server from the last time the external filter server was to `bld`.

### denies

The total number of checkouts denied by the license server from the last time the external filter server was to `bld`.

## See Also

[blparams](#)

# blstat

displays dynamic license information

## Synopsis

```
blstat [-G] [-s] [-S] [-D service_domain_name |  
        "service_domain_name ..."] [-Lp ls_project_name |  
        "ls_project_name ..."] [-t token_name | "token_name ..."]  
blstat [ -h | -V]
```

## Description

Displays license usage statistics.

By default, shows information about all licenses and all clusters.

## Options

- G** Displays dynamic hierarchical license information.  
`blstat -G` also works with the `-t` option to only display hierarchical information for the specified feature names.
- S** Displays information on the license server associated with license features.
- s** Displays license usage of the LSF and non-LSF workloads. Workload distributions are defined by `WORKLOAD_DISTRIBUTION` in `lsf.licensescheduler`. If there are any distribution policy violations, `blstat` marks these with an asterisk (\*) at the beginning of the line.

### **-D *service\_domain\_name* | "*service\_domain\_name ...*"**

Only shows information about specified service domains. Use spaces to separate multiple names, and enclose them in quotation marks.

### **-Lp *ls\_project\_name* | "*ls\_project\_name ...*"**

Only shows license information for specified projects. Use spaces to separate multiple names, and enclose them in quotation marks.

### **-t *token\_name* | "*token\_name ...*"**

Only shows information about specified licenses. Use spaces to separate multiple names, and enclose them in quotation marks.

**-h** Prints command usage to `stderr` and exits.

**-V** Prints the release version to `stderr` and exits.

## Output

Information is organized first by license feature, then by service domain. For each combination of license and service domain, License Scheduler displays a line of summary information followed by rows of license project information (one row for each license project configured to use the license).

## Output

In each group of statistics, numbers and percentages refer only to licenses of the specified license feature that can be checked out from FLEXnet license server hosts in the specified service domain.

### Summary output

<b>FEATURE</b>	The license name. (This appears only once for each feature.)
<b>SERVICE_DOMAIN</b>	The name of the service domain that provided the license.
<b>TOTAL_INUSE</b>	The number of licenses in use by License Scheduler projects. (Licenses in use have been checked out from the FLEXnet license manager.)
<b>TOTAL_RESERVE</b>	The number of licenses reserved for License Scheduler projects. (Licenses that are reserved and have not been checked out from the FLEXnet license manager.)
<b>TOTAL_FREE</b>	The number of free licenses that are available to License Scheduler projects. (Licenses that are not reserved or in use.)
<b>OTHERS</b>	The number of licenses checked out by users who are not submitting their jobs to License Scheduler projects. By default, these licenses are not being managed by License Scheduler policies. To enforce license distribution policies for these license features, configure <code>ENABLE_DYNAMIC_RUSAGE=Y</code> in the feature section for those features in <code>lsf.licensescheduler</code> .

### Workload output

<b>LSF_USE</b>	The total number of licenses in use by License Scheduler projects in the LSF workload.
<b>LSF_DESERVE</b>	The total number of licenses assigned to License Scheduler projects in the LSF workload..
<b>LSF_FREE</b>	The total number of free licenses available to License Scheduler projects in the LSF workload.
<b>NON_LSF_USE</b>	The total number of licenses in use by projects in the non-LSF workload.
<b>NON_LSF_DESERVE</b>	The total number of licenses assigned to projects in the non-LSF workload.
<b>NON_LSF_FREE</b>	The total number of free licenses available to projects in the non-LSF workload.

### Project output

For each project that is configured to use the license, `blstat` displays the following information.

<b>PROJECT</b>	The License Scheduler project name.
----------------	-------------------------------------

**SHARE** The percentage of licenses assigned to the license project by the License Scheduler administrator. This determines how many licenses the project is entitled to when there is competition for licenses. This information is static.

The percentage is calculated to one decimal place using the share assignment in `lsf.licensescheduler`.

**INUSE** The number of licenses in use by the license project. (Licenses in use have been checked out from the FLEXnet license manager.)

**RESERVE** The number of licenses reserved for the license project. (The corresponding job has started to run, but has not yet checked out its license from the FLEXnet license manager.)

**FREE** The number of licenses the license project has free. (The license tokens have been allocated to the license project by License Scheduler, but the licenses are not reserved and have not yet been checked out from the FLEXnet license manager.)

**DEMAND** `y|n`  
`n` indicates that this license project's license requirements are satisfied.  
`y` indicates that this license project needs more license tokens. (It has pending jobs waiting for this license feature.)

**NON\_SHARED** The number of non-shared licenses belonging to the license project. (The license tokens allocated to non-shared distribution are scheduled before the tokens allocated to shared distribution.)

## Hierarchical output

**SHARE\_INFO\_FOR** The root member and name of the hierarchical group. The project information displayed after this title shows the information specific to this particular hierarchical group. If this root member is itself a member of another hierarchical group, the relationship is displayed as follows:

*/root\_name/member\_name/...*

**PROJECT/GROUP** The members of the hierarchical group, listed by its group or project name.

## Viewing license feature locality

When `LOCAL_TO` is configured for a feature in `lsf.licensescheduler`, `blstat` shows the cluster locality information for the license features. For example, with a group distribution configuration `blstat` shows the locality of the `hspice` feature configured for various sites:

```
blstat
FEATURE: hspice
SERVICE_DOMAIN: SD3 SD4
TOTAL_INUSE: 0    TOTAL_RESERVE: 0    TOTAL_FREE: 22    OTHERS: 0
PROJECT          SHARE      INUSE    RESERVE  FREE    DEMAND
Lp1              50.0 %   0        0        11     n
Lp2              50.0 %   0        0        11     n
```

## See Also

```
FEATURE: hspice@clusterA
SERVICE_DOMAIN: SD1
TOTAL_INUSE: 0    TOTAL_RESERVE: 0    TOTAL_FREE: 25    OTHERS: 0
PROJECT          SHARE      INUSE    RESERVE  FREE    DEMAND
Lp1              50.0 %    0        0        12     n
Lp2              50.0 %    0        0        13     n

FEATURE: hspice@siteB
SERVICE_DOMAIN: SD2
TOTAL_INUSE: 0    TOTAL_RESERVE: 0    TOTAL_FREE: 65    OTHERS: 0
PROJECT          SHARE      INUSE    RESERVE  FREE    DEMAND
Lp1              50.0 %    0        0        32     n
Lp2              50.0 %    0        0        33     n
```

## See Also

[blhosts](#), [blinfo](#)

# bltasks

displays License Scheduler interactive task information

## Synopsis

```
bltasks [-l] [task_ID]  
bltasks [-l] [-p | -r | -w] [-Lp "ls_project_name..."]  
[-m "host_name..."] [-t "terminal_name..."] [-u "user_name..."]  
bltasks [-h | -V]
```

## Description

Displays current information about interactive tasks managed by License Scheduler (submitted using `taskman`).

By default, displays information about all tasks.

## Options

- task\_ID*** Only displays information about the specified task.
- l** Long format. Displays detailed information for each task in a multi-line format.
- p** Only displays information about tasks with `PREEMPTED` status.  
Cannot be used with `-r` or `-w`.
- r** Only displays information about tasks with `RUN` status.  
Cannot be used with `-p` or `-w`.
- w** Only displays information about tasks with `WAIT` status.  
Cannot be used with `-p` or `-r`.

**-Lp "*ls\_project\_name...*"**

Only displays information about tasks associated with the specified projects.

**-m "*host\_name...*"**

Only displays information about tasks submitted from the specified hosts.

**-t "*terminal\_name...*"**

Only displays information about tasks submitted from the specified terminals.

**-u "*user\_name...*"**

Only displays information about tasks submitted by the specified users.

**-h** Prints command usage to `stderr` and exits.

**-V** Prints License Scheduler release version to `stderr` and exits.

## Output

### Default Output

Displays the short format with the following information:

## Output

TID	Task ID that License Scheduler assigned to the task.
USER	The user who submitted the task.
STAT	The current status of the task. <ul style="list-style-type: none"><li>◆ RUN: Task is running.</li><li>◆ WAIT: Task has not yet started.</li><li>◆ PREEMPT: Task has been preempted and currently has no license token.</li></ul>
HOST	The name of host from which the task was submitted.
PROJECT	The name of the project to which the task belongs.
FEATURES	Name of the License Scheduler token.
CONNECT TIME	The submission time of the task.

## Output for -l Option

Displays detailed information for each task in multi-line format. If the task is in WAIT status, `bltasks` displays "The application manager is waiting for a token to start" and the resource requirement. Otherwise, the current resource usage of task is displayed as follows:

TERMINAL	The terminal the task is using.
PGID	UNIX process group ID.
CPU	The total accumulated CPU time of all processes in a task, in seconds.
MEM	Total resident memory usage of all processes in a task, in KB.
SWAP	Total virtual memory usage of all processes in a task, in KB.
Keyboard idle since	Time at which the task became idle.
RES_REQ	The resource requirement of the task.
Command line	The command the License Scheduler task manager is executing.

# blusers

displays license usage information

## Synopsis

```
blusers [-J | -l | -P -j job_ID -u user_name -m host_name | -P  
        -c cluster_name -j job_ID -u user_name -m host_name]  
blusers [-h | -V]
```

## Description

By default, displays summarized information about usage of licenses.

## Options

- J** Displays detailed license usage information about each job.
- l** Long format. Displays additional license usage information. See [Output](#) on page 109 for a description of information that is displayed.

**-P -j *job\_ID* -u *user\_name* -m *host\_name***

**-P -c *cluster\_name* -j *job\_ID* -u *user\_name* -m *host\_name***

This string of options is designed to be used in a customized preemption script. To identify a job, specify the LSF job ID, the user name, and the name of the host where the job is running.

(If the job is an interactive task submitted using `taskman`, do not specify `-c cluster_name`.)

You see the display terminal used by the job, the licenses it has checked out, and the license servers that provided the licenses. There is one line of output for each license feature from each FLEXnet license server, in the format:

```
port_number@host_name token_name user_name host_name display
```

- h** Prints command usage to `stderr` and exits.
- v** Prints License Scheduler release version to `stderr` and exits.

## Output

### Default Output

<b>FEATURE</b>	The license name. This becomes the license token name.
<b>SERVICE_DOMAIN</b>	The name of the service domain that provided the license.
<b>USER</b>	The name of the user who submitted the jobs.
<b>HOST</b>	The name of the host where jobs have started.
<b>NLICS</b>	The number of licenses checked out from FLEXnet.
<b>NTASKS</b>	The number of running tasks using these licenses.

## Examples

### -J Output

Displays the following summary information for each job:

<b>JOBID</b>	The job ID assigned by LSF.
<b>USER</b>	The name of the user who submitted the job.
<b>HOST</b>	The name of the host where the job has been started.
<b>PROJECT</b>	The name of the license project that the job is associated with.
<b>CLUSTER</b>	The name of the LSF cluster that the job is associated with. Displays “-” for an interactive job.
<b>START_TIME</b>	The job start time.
	Displays the following information for each license in use by the job:
<b>RESOURCE</b>	The name of the license requested by the job.
<b>RUSAGE</b>	The number of licenses requested by the job.
<b>SERVICE_DOMAIN</b>	The name of the service domain that provided the license. The keyword UNKNOWN means the job requested a license from License Scheduler but has not checked out the license from FLEXnet.

### Long Output (-l)

Displays the default output and the following additional information for each job:

<b>OTHERS</b>	License usage for non-managed or non-LSF workload.
<b>DISPLAYS</b>	Terminal display associated with the license feature.
<b>PIDS</b>	Process ID of the process that checked out the license feature. The Macrovision FLEXnet plugin for LSF License Scheduler must be enabled to display the process ID.

### Viewing license feature locality

When LOCAL\_TO is configured for a feature in `lsf.licensescheduler`, `blusers` shows the cluster locality information for the license features. For example:

```
blusers
FEATURE          SERVICE_DOMAIN  USER    HOST      NLICS  NTASKS
hspice@clusterA  SD1             user1   host1     1      1
hspice@siteB    SD2             user2   host2     1      1
```

## Examples

```
blusers -l
FEATURE  SERVICE_DOMAIN  USER  HOST  NLICS  NTASKS  OTHERS  DISPLAYS  PIDS
feat1    LanServer       user1  hostA  1      1      0      (/dev/tty) (16326)
```

```
blusers -J
JOBID  USER      HOST      PROJECT      CLUSTER      START_TIME
553    user1     hostA     p3            cluster1     Oct  5 15:47:14
RESOURCE  RUSAGE      SERVICE_DOMAIN
p1_f1    1           app_1
```

## See Also

[blhosts](#), [blinfo](#), [blstat](#)

bmgroup

# bmgroup

displays information about host groups

## Synopsis

```
bmgroup [-r] [-l] [-w] [host_group ...]
```

```
bmgroup [-h | -V]
```

## Description

Displays host groups and host names for each group.

By default, displays information about all host groups including host groups created for EGO-enabled SLA scheduling. A host partition is also considered a host group.

## Host groups for EGO-enabled SLA

When hosts are allocated to an EGO-enabled SLA, they are dynamically added to a host group created by the SLA. The name of the host group is `_sla_sla_name`, where `sla_name` is the name of the EGO-enabled SLA defined in `lsb.serviceclasses` or in `ENABLE_DEFAULT_EGO_SLA` in `lsb.params`. One of the hosts in the host group will have the name `_virtual`.

When the host is released to EGO, the entry is removed from the host group. `bmgroup` displays the hosts allocated by EGO to the host group created by the SLA.

## Options

- l** Displays static and dynamic host group members. A '+' sign before the host name indicates that the host is dynamic and is currently a member of the host group. A '-' sign before the host name indicates that the host is currently not an LSF host but is a member of the dynamic host group.  
Also identifies condensed host groups. These host groups are defined by `CONDENSE` in the `HostGroup` section of `lsb.hosts`.
- r** Expands host groups recursively. The expanded list contains only host names; it does not contain the names of subgroups. Duplicate names are listed only once.
- w** Wide format. Displays host and host group names without truncating fields.
- host\_group* ...** Only displays information about the specified host groups. Do not use quotes when specifying multiple host groups.
- h** Prints command usage to `stderr` and exits.
- V** Prints LSF release version to `stderr` and exits.

## Output

In the list of hosts, a name followed by a slash (/) indicates a subgroup.

## Files

Host groups and host partitions are defined in the configuration file `lsb.hosts(5)`.

## See Also

[lsb.hosts\(5\)](#), [bugroup\(1\)](#), [bhosts\(1\)](#)

# bmig

migrates checkpointable or rerunnable jobs

## Synopsis

```
bmig [-f] [job_ID | "job_ID[index_list"] ] ...
bmig [-f] [-J job_name] [-m "host_name ..." | -m "host_group ..."]
      [-u user_name | -u user_group | -u all] [0]
bmig [-h | -V]
```

## Description

Migrates one or more of your checkpointable or rerunnable jobs to a different host. You can migrate only running or suspended jobs; you cannot migrate pending jobs. Members of a chunk job in the `WAIT` state can be migrated; LSF removes waiting jobs from the job chunk and changes their original dispatch sequence.

By default, migrates the most recently submitted job, or the most recently submitted job that also satisfies other specified options (`-u` and `-J`). Specify 0 (zero) to migrate multiple jobs. Only LSF administrators and `root` can migrate jobs submitted by other users. Both the original and the new hosts must:

- ◆ Be binary compatible
- ◆ Run the same dot version of the operating system for predictable results
- ◆ Have network connectivity and read/execute permissions to the checkpoint and restart executables (in `LSF_SERVERDIR` by default)
- ◆ Have network connectivity and read/write permissions to the checkpoint directory and the checkpoint file
- ◆ Have access to all files open during job execution so that LSF can locate them using an absolute path name

When you migrate a checkpointable job, LSF checkpoints and kills the job and then restarts the job on the next available host. If checkpoint fails, the job continues to run on the original host. If you issue the `bmig` command while a job is being checkpointed—for example, with periodic checkpointing enabled—LSF ignores the migration request.

When you migrate a rerunnable job, LSF kills the job and then restarts it from the beginning on the next available host. LSF sets the environment variable `LSB_RESTART` to `Y` when a migrating job restarts or reruns.

---

**NOTE:** The user does not receive notification when LSF kills a checkpointable or rerunnable job as part of job migration.

---

In a MultiCluster environment, you must use `brun` rather than `bmig` to move a job to another host.

When absolute job priority scheduling (APS) is configured in the queue, LSF always schedules migrated jobs before pending jobs. For migrated jobs, LSF keeps the existing job priority. If `LSB_REQUEUE_TO_BOTTOM` and `LSB_MIG2PEND` are

configured in `lsf.conf`, the migrated jobs keep their APS information, and the migrated jobs compete with other pending jobs based on the APS value. If you want to reset the APS value, you must use `bqueue` instead of `bmig`.

## Options

- f** Forces a checkpointable job to be checkpointed and migrated, even if non-checkpointable conditions exist within the operating system environment.

**`job_ID | "job_ID[index_list]" | 0`**

Migrates jobs with the specified job IDs. LSF ignores the `-J` and `-u` options.

If you specify a job ID of 0 (zero), LSF ignores all other job IDs and migrates all jobs that satisfy the `-J` and `-u` options.

If you do not specify a job ID, LSF migrates the most recently submitted job that satisfies the `-J` and `-u` options.

- `-J job_name`** Migrates the job with the specified name. Ignored if a job ID other than 0 (zero) is specified.

**`-m "host_name ..." | -m "host_group ..."`**

Migrates jobs to the specified hosts.

This option cannot be used on a MultiCluster job; `bmig` can only restart or rerun the job on the original host.

**`-u "user_name" | -u "user_group" | -u all`**

Migrates only those jobs submitted by the specified users. To specify a Windows user account, include the domain name in uppercase letters and use a single backslash (`DOMAIN_NAME\user_name`) in a Windows command line or a double backslash (`DOMAIN_NAME\\user_name`) in a UNIX command line.

If you specify the reserved user name `all`, LSF migrates jobs submitted by all users. Ignored if a job ID other than 0 (zero) is specified.

- h** Prints command usage to `stderr` and exits.
- v** Prints LSF release version to `stderr` and exits.

## See Also

[bsub](#), [brestart](#), [bchkpnt](#), [bjobs](#), [bqueues](#), [bhsts](#), [bugroup](#), [mbatchd](#), [lsb.queues](#), [kill](#)

# bmod

modifies job submission options of a job

## Synopsis

```
bmod [bsub_options] [job_ID | "job_ID[index]" ]
bmod [-g job_group_name | -gn] [job_ID]
bmod [-sla service_class_name | -slan] [job_ID]
bmod [-aps "system=value" | "admin=value" | -apsn] [job_ID]
bmod [-h | -V]
```

## Option List

```
[-B | -Bn]
[-N | -Nn]
[-r | -rn]
[-ul | -uln]
[-x | -xn]
[-a esub_application]
[-app application_profile_name | -appn]
[-aps "system=value" | "admin=value" | -apsn]
[-b begin_time | -bn]
[-C core_limit | -Cn]
[-c [hour:]minute[/host_name | /host_model] | -cn]
[-cwd "current_working_directory" | -cwdn]
[-D data_limit | -Dn]
[-E "pre_exec_command [argument ...]" | -En]
[-Ep "post_exec_command [argument ...]" | -Epn]
[-e err_file | -en]
[-eo err_file | -en]
[-ext[sched] "external_scheduler_options"]
[-F file_limit | -Fn]
[-f "local_file op [remote_file]" ... | -fn]
[-G user_group | -Gn]
[-g job_group_name | -gn]
[-i input_file | -in | -is input_file | -isn]
[-J job_name | -J "%job_limit" | -Jn]
[-k checkpoint_dir | -k "checkpoint_dir [checkpoint_period]
[method=method_name]" | -kn]
[-L login_shell | -Ln]
```

```

[-Lp ls_project_name | -Lpn]
[-M mem_limit | -Mn]
[-m "host_name[@cluster_name][[!] | +[pref_level]] | host_group[[!] |
+[pref_level]] ..." | -mn]
[-n num_processors | -nn ]
[-o out_file | -on]
[-oo out_file | -oon]
[-P project_name | -Pn]
[-p process_limit | -pn]
[-q "queue_name ..." | -qn]
[-R "res_req" [-R "res_req" ...] | -Rn]
[-S stack_limit | -Sn]
[-s signal | -sn]
[-sla service_class_name | -slan]
[-sp priority | -spn]
[-T thread_limit | -Tn]
[-t term_time | -tn]
[-U reservation_ID | -Un]
[-u mail_user | -un]
[-v swap_limit | -vn]
[-W [hour:] minute[/host_name | /host_model] | -Wn]
[-We [hour:] minute[/host_name | /host_model] | -Wen]
[-w 'dependency_expression' | -wn]
[-wa 'signal | command | CHKPNT]' | -wan]
[-wt 'job_warning_time' | -wtn]
[-Z "new_command" | -Zs "new_command" | -Zsn]
[job_ID | "job_ID[index"] ]

```

## Description

Modifies the options of a previously submitted job. See `bsub` for complete descriptions of job submission options you can modify with `bmod`.

Only the owner of the job, or LSF administrators, can modify the options of a job.

All options specified at submission time may be changed. The value for each option may be overridden with a new value by specifying the option as in `bsub`. To reset an option to its default value, use the option string followed by 'n'. Do not specify an option value when resetting an option.

The `-i`, `-in`, and `-Z` options have counterparts that support spooling of input and job command files (`-is`, `-isn`, `-Zs`, and `-Zsn`).

## Description

Options related to file names and job spooling directories support paths that contain up to 4094 characters for UNIX and Linux, or up to 255 characters for Windows.

Options related to command names and job names can contain up to 4094 characters for UNIX and Linux, or up to 255 characters for Windows.

You can modify all options of a pending job, even if the corresponding `bsub` option was not specified.

Modifying a job that is pending in a chunk job queue (`CHUNK_JOB_SIZE`) removes the job from the chunk to be scheduled later.

Like `bsub`, `bmod` calls the master `esub` (`mesub`), which invokes any mandatory `esub` executables configured by an LSF administrator, and any executable named `esub` (without `.application`) if it exists in `LSF_SERVERDIR`. Only `esub` executables invoked by `bsub` can change the job environment on the submission host. An `esub` invoked by `bmod` cannot change the job environment.

`-cwdn` sets the current working directory for the job to the directory where `bmod` is running.

`-Epn` cancels the setting of job-level post-execution commands. The job-level post-execution commands will not run. Application-level post-execution commands will run if it exists.

`-rn` resets the rerunnable job setting specified by `bsub -rn` or `bsub -r`. The application profile and queue level rerunnable job setting if any is used. `bmod -rn` does not disable or override job rerun if the job was submitted to a rerunnable queue or application profile with job rerun configured. `bmod -rn` is different from `bsub -rn`, which *does* override the application profile and queue level rerunnable job setting.

`-uln` sets the user shell limits for pending jobs to their default values. `-uln` is not supported on Windows.

`-Wen` cancels the estimated job runtime. The runtime estimate will not take effect for the job.

## Modifying running jobs

By default, you can modify resource requirements for running jobs (`-R "res_req"`). To modify additional job options for running jobs, define `LSB_MOD_ALL_JOBS=Y` in `lsf.conf`.

When `LSB_MOD_ALL_JOBS=Y` is set, the following are the only `bmod` options that are valid for running jobs. You cannot make any other modifications after a job has been dispatched.

- ◆ CPU limit (`-c [hour:]minute[/host_name | /host_model]`)
- ◆ Memory limit (`-M mem_limit`)
- ◆ Rerunnable jobs (`-r | -rn`)
- ◆ Resource reservation (`-R "res_req"`)
- ◆ Run limit (`-W run_limit[/host_name | /host_model]`)
- ◆ Standard output (`stdout`) file name up to 4094 characters for UNIX and Linux or 255 characters for Windows (`-o output_file`)

- ◆ Standard error (`stderr`) file name up to 4094 characters for UNIX and Linux or 255 characters for Windows (`-e error_file`)
- ◆ Overwrite standard output (`stdout`) file name up to 4094 characters for UNIX and Linux or 255 characters for Windows (`-oo output_file`)
- ◆ Overwrite standard error (`stderr`) file name up to 4094 characters for UNIX and Linux or 255 characters for Windows (`-eo error_file`)

Modified resource usage limits cannot exceed limits defined in the queue.

To modify the CPU limit or the memory limit of running jobs, the parameters `LSB_JOB_CPULIMIT=Y` and `LSB_JOB_MEMLIMIT=Y` must be defined in `lsf.conf`.

If you want to specify array dependency by array name, set `JOB_DEP_LAST_SUB` in `lsb.params`. If you do not have this parameter set, the job will be rejected if one of your previous arrays has the same name but a different index.

By default, options for the following resource usage limits are specified in KB:

- ◆ Core limit (`-C`)
- ◆ Memory limit (`-M`)
- ◆ Stack limit (`-S`)
- ◆ Swap limit (`-v`)

Use `LSF_UNIT_FOR_LIMITS` in `lsf.conf` to specify a different unit for the limit (MB, GB, TB, PB, or EB).

## Modifying resource requirements

The `-R` option of `bmod` completely replaces any previous resource requirement specification. It does not add the modification to the existing specification. For example, if you submit a job with

```
bsub -R "rusage[res1=1]"
```

then modify it with

```
bmod -R "rusage[res2=1]"
```

the new resource usage requirement for the job is `[res2=1]`, not `[res1=1; res2=1]`.

`bmod` does not support the OR (`|`) operator on the `-R` option.

To remove all of the string input specified using the `bsub` command, use the `-Rn` option.

## Modifying advance reservations

If advance reservations are enabled, administrators can use the `-U` option of `bmod` to change a job to another reservation ID. For example:

```
bmod -U user1#0 1234
```

To cancel the reservation, use the `-Un` option of `bmod`. For example:

```
bmod -Un 1234
```

**Closed reservations** LSF administrators can prevent running jobs from being killed when the reservation expires by changing the termination time of the job using the reservation (`bmod -t`) before the reservation window closes.

## Description

For example:

```
bmod -t 15:0 1234
```

You can only modify the termination time of an advance reservation job while the reservation is active. When the reservation expires or is deleted, the job is killed and you can no longer make any modifications.

---

**CAUTION:** `bmod -t` will not change the termination time of a pending job.

---

## Open reservations

LSF users can modify the termination time of their open advance reservations without interfering with current job scheduling policies. For example, you specify two open advance reservations as follows:

```
brsvadd -o -n 1 -m hostA -u user1 -b 15:10 -e 15:30
```

Reservation user1#17 is created

```
brsvadd -o -n 1 -m hostA -u user1 -b 15:35 -e 15:50
```

Reservation user1#18 is created

At 15:15, while job 122 in user1#17 is running, you modify its termination time as follows:

```
bmod -t 15:40 122
```

This termination time overlaps the reservation window of user1#18, in which job 245 started at 15:35. After modifying the termination time of job 122, the following events occur:

At 15:50, both Job 122 in reservation user#17 and Job 245 in reservation user#18 are suspended. At this point, the existing scheduling policies determine which job runs; in this example, Job 122 in reservation user#17 runs.

At this time ...	These events occur ...
15:35	<ul style="list-style-type: none"><li>◆ Job 122 in reservation user1#17 suspends</li><li>◆ Job 245 in reservation user1#18 starts</li></ul>
15:40	<ul style="list-style-type: none"><li>◆ Job 122 in reservation user#17 is still suspended</li><li>◆ Job 245 in reservation user#18 continues to run</li></ul>
15:50	<ul style="list-style-type: none"><li>◆ Job 122 in reservation user1#17 suspends</li><li>◆ Job 245 in reservation user1#18 suspends</li></ul>
15:51	<ul style="list-style-type: none"><li>◆ Job 122 in reservation user1#17 runs</li><li>◆ Job 245 in reservation user1#18 suspends</li></ul>

## Modifying job groups

Use the `-g` option of `bmod` and specify a job group path to move a job or a job array from one job group to another. For example:

```
bmod -g /risk_group/portfolio2/monthly 105
```

moves job 105 to job group /risk\_group/portfolio2/monthly.

Like `bsub -g`, if the job group does not exist, LSF creates it.

`bmod -g` cannot be combined with other `bmod` options. It can only operate on pending jobs. It cannot operate on running or finished jobs.

You can modify your own job groups and job groups that other users create under your job groups. LSF administrators can modify job groups of all users.

You cannot move job array elements from one job group to another, only entire job arrays. If any job array elements in a job array are running, you cannot move the job array to another group. A job array can only belong to one job group at a time.

You cannot modify the job group of a job attached to a service class.

## Modifying jobs in service classes

The `-sla` option modifies a job by attaching it to the specified service class. The `-slan` option detaches the specified job from a service class. If the service class does not exist, the job is not modified. For example:

```
bmod -sla Kyuquot 2307
```

attaches job 2307 to the service class `Kyuquot`.

```
bmod -slan 2307
```

detaches job 2307 from the service class `Kyuquot`. If a default SLA is configured in `lsb.params`, the job is moved to the default service class.

You cannot

- ◆ Use `-sla` with other `bmod` options
- ◆ Move job array elements from one service class to another, only entire job arrays
- ◆ Modify the service class of job already attached to a job group. Use `bsla` to display the configuration properties of service classes configured in `lsb.serviceclasses`, the default SLA configured in `lsb.params`, and dynamic information about the state of each service class.

If a default SLA is configured in `lsb.params`, `bmod -slan` moves the job to the default SLA. If the job is already attached to the default SLA, `bmod -slan` has no effect on that job.

## Modifying jobs associated with application profiles

The `-app` option modifies a job by associating it to the specified application profile. The `-appn` option dissociates the specified job from its application profile. If the application profile does not exist, the job is not modified.

You can only modify the application profile for pending jobs. For example:

```
bmod -app fluent 2308
```

associates job 2308 with the application profile `fluent`.

```
bmod -appn 2308
```

dissociates job 2308 from the service class `fluent`.

Use `bapp` to display the properties of application profiles configured in `LSB_CONFDIR/cluster_name/configdir/lsb.applications`.

## Modifying absolute priority scheduling options

Administrators can use `bmod -aps` to adjust the APS value for pending jobs.

`bmod -apn` cancels previous `bmod -aps` settings. You cannot combine `bmod -aps` with other `bmod` options.

## Options

**bmod -aps**  
**"system=value"**  
*job\_ID*

Set a static non-zero APS value of a pending job. Setting a system APS value overrides any calculated APS value for the job. The system APS value cannot be applied to running jobs.

**bmod -aps**  
**"admin=value"**  
*job\_ID*

Set a non-zero ADMIN factor value for a pending job. The ADMIN factor adjusts the calculated APS value higher or lower. A negative admin value is lowers the calculated APS value, and a positive value raises the calculated APS value relative to other pending jobs in the APS queue.

You cannot configure APS weight, limit, or grace period for the ADMIN factor. The ADMIN factor takes effect as soon as it is set.

**bmod -apsn**

Run `bmod -apsn` to cancel previous `bmod -aps` settings. You cannot apply `bmod -apsn` on running jobs in an APS queue. An error is issued if the job has no system APS priority or ADMIN factor set.

## Options

*job\_ID* | "*job\_ID[index]*"

Modifies jobs with the specified job ID.

Modifies job array elements specified by "*job\_ID[index]*".

- h** Prints command usage to `stderr` and exits.
- v** Prints LSF release version to `stderr` and exits.

## Limitations

Modifying remote running jobs in a MultiCluster environment is not supported.

If you do not specify `-e` or `-eo` before the job is dispatched, you cannot modify the name of job error file for a running job. Modifying the job output options of remote running jobs is not supported.

## See Also

[bsub](#)

# bparams

displays information about configurable system parameters in `lsb.params`

## Synopsis

```
bparams [-a] [-l]
```

```
bparams [-h | -V]
```

## Description

Displays the following parameter values:

- ◆ Default Queues
- ◆ Job Dispatch Interval
- ◆ Job Checking Interval
- ◆ Job Accepting Interval

## Options

- a** All format. Displays all the configurable parameters set in `lsb.params`.
- l** Long format. Displays detailed information about all the configurable parameters in `lsb.params`.
- h** Prints command usage to `stderr` and exits.
- V** Prints LSF release version to `stderr` and exits.

## See Also

`lsb.params`

bpeek

# bpeek

displays the `stdout` and `stderr` output of an unfinished job

## Synopsis

```
bpeek [-f] [-q queue_name | -m host_name | -J job_name |  
      job_ID | "job_ID[index_list]"]  
bpeek [-h | -V]
```

## Description

Displays the standard output and standard error output that have been produced by one of your unfinished jobs, up to the time that this command is invoked.

By default, displays the output using the command `cat`.

This command is useful for monitoring the progress of a job and identifying errors. If errors are observed, valuable user time and system resources can be saved by terminating an erroneous job.

## Options

- f** Displays the output of the job using the command `tail -f`.
- q *queue\_name*** Operates on your most recently submitted job in the specified queue.
- m *host\_name*** Operates on your most recently submitted job that has been dispatched to the specified host.
- J *job\_name*** Operates on your most recently submitted job that has the specified job name.  
The job name can be up to 4094 characters long for UNIX and Linux or up to 255 characters for Windows.

***job\_ID* | "*job\_ID[index\_list]*"**

Operates on the specified job.

- h** Prints command usage to `stderr` and exits.
- V** Prints LSF release version to `stderr` and exits.

## See Also

`cat`, `tail`, [bsub](#), [bjobs](#), [bhist](#), [bhosts](#), [bqueues](#)

# bpost

sends external status messages and attaches data files to a job

## Synopsis

```
bpost [-i message_index] [-d "description"] [-a data_file]  
      job_ID | "job_ID[index]" | -J job_name  
bpost [-h | -V]
```

## Description

Provides external status information or sends data to a job in the system. Done or exited jobs cannot accept messages.

By default, operates on the message index 0. By default, posts the message "no description".

If a you specify a job ID:

- ◆ You can only send messages and data to your own jobs.
- ◆ You cannot send messages and data to jobs submitted by other users.
- ◆ Only root and LSF administrators can send messages to jobs submitted by other users.
- ◆ Root and LSF administrators cannot attach data files to jobs submitted by other users.

Job names are not unique; if you specify -J *job\_name*:

- ◆ You can only send messages and data to your own jobs.
- ◆ You cannot send messages and data to jobs submitted by other users.
- ◆ Root and the LSF administrators can only send messages and data to their own jobs.

A job can accept messages until it is cleaned from the system. If your application requires transfer of data from one job to another, use the -a option of `bpost(1)` to attach a data file to the job, then use the `bread(1)` command to copy the attachment to another file.

You can associate several messages and attached data files with the same job. As the job is processed, use `bread(1)` or `bstatus(1)` to retrieve the messages posted to the job. Use `bread(1)` to copy message attachments to external files.

For example, your application may require additional job status descriptions besides the ones that LSF provides internally (PEND, RUN, SUSP, etc.) Use the -d option to place your own status or job description text as a message to the job.

You can also use `bstatus -d` to update the external job status. The command:

```
bstatus -d "description" myjob
```

is equivalent to:

```
bpost -i 0 -d "description" myjob
```

## Options

With MultiCluster, both clusters must run LSF Version 7 or later. You cannot post a message to a MultiCluster job if the clusters are disconnected. You cannot attach files to MultiCluster jobs.

## Options

**-a *data\_file*** Attaches the specified data file to the job external storage. This option is ignored for MultiCluster jobs; you can only attach a file if the job executes in the local cluster.

Use the `JOB_ATTA_DIR` parameter in `lsb.params(5)` to specify the directory where attachment data files are saved. The directory must have at least 1 MB of free space. `mbatchd` checks for available space in the job attachment directory before transferring the file.

Use the `MAX_JOB_ATTA_SIZE` parameter in `lsb.params` to set a maximum size for job message attachments.

**-d "*description*"** Places your own status text as a message to the job. The message description has a maximum length of 512 characters.

For example, your application may require additional job status descriptions besides the ones that LSF provides internally (PEND, RUN, SUSP, etc.)

Default: "no description"

**-i *message\_index*** Operates on the specified message index.

Default: 0

Use the `MAX_JOB_MSG_NUM` parameter in `lsb.params` to set a maximum number of messages for a job. With MultiCluster, to avoid conflicts, `MAX_JOB_MSG_NUM` should be the same in all clusters.

***job\_ID* | "*job\_ID[index]*" | -J *job\_name***

Required. Operates on the specified job. With MultiCluster job forwarding model, you must always use the local job ID.

**-h** Prints command usage to `stderr` and exits.

**-v** Prints LSF release version to `stderr` and exits.

## Example

```
bpost -i 1 -d "step 1" -a step1.out 2500
```

Puts the message text `step 1` into message index 1, and attaches the file `step1.out` to job 2500.

## See Also

[bread\(1\)](#), [bstatus\(1\)](#), `MAX_JOB_ATTA_SIZE`, `MAX_JOB_MSG_NUM`

# bqueues

displays information about queues

## Synopsis

```
bqueues [-w | -l | -r]
        [-m host_name | -m host_group | -m cluster_name | -m all]
        [-u user_name | -u user_group | -u all] [queue_name ...]

bqueues [-h | -V]
```

## Description

Displays information about queues.

By default, returns the following information about all queues: queue name, queue priority, queue status, job slot statistics, and job state statistics.

In MultiCluster, returns the information about all queues in the local cluster.

Batch queue names and characteristics are set up by the LSF administrator (see `lsb.queues(5)` and `mbatchd(8)`).

CPU time is normalized.

## Options

- l** Displays queue information in a long multiline format. The `-l` option displays the following additional information: queue description, queue characteristics and statistics, scheduling parameters, resource usage limits, scheduling policies, users, hosts, associated commands, dispatch and run windows, and job controls.

Also displays user shares.

If you specified an administrator comment with the `-C` option of the queue control commands `qclose`, `qopen`, `qact`, and `qinact`, `qhst` displays the comment text.

Displays absolute priority scheduling (APS) information for queues configured with `APS_PRIORITY`.

- r** Displays the same information as the `-l` option. In addition, if `fairshare` is defined for the queue, displays recursively the share account tree of the `fairshare` queue.
- w** Displays queue information in a wide format. Fields are displayed without truncation.

**-m *host\_name* | -m *host\_group* | -m *cluster\_name* | -m *all***

Displays the queues that can run jobs on the specified host. If the keyword `all` is specified, displays the queues that can run jobs on all hosts.

If a host group is specified, displays the queues that include that group in their configuration. For a list of host groups see `bmgroup(1)`.

In MultiCluster, if the `all` keyword is specified, displays the queues that can run jobs on all hosts in the local cluster. If a cluster name is specified, displays all queues in the specified cluster.

**-u *user\_name* | -u *user\_group* | -u *all***

## Output

Displays the queues that can accept jobs from the specified user. If the keyword `all` is specified, displays the queues that can accept jobs from all users.

If a user group is specified, displays the queues that include that group in their configuration. For a list of user groups see `bugroup(1)`.

**queue\_name ...** Displays information about the specified queues.

**-h** Prints command usage to `stderr` and exits.

**-V** Prints LSF release version to `stderr` and exits.

## Output

### Default Output

Displays the following fields:

#### QUEUE\_NAME

The name of the queue. Queues are named to correspond to the type of jobs usually submitted to them, or to the type of services they provide.

##### **lost\_and\_found**

If the LSF administrator removes queues from the system, LSF creates a queue called `lost_and_found` and places the jobs from the removed queues into the `lost_and_found` queue. Jobs in the `lost_and_found` queue will not be started unless they are switched to other queues (see `bswitch`).

#### PRIO

The priority of the queue. The larger the value, the higher the priority. If job priority is not configured, determines the queue search order at job dispatch, suspension and resumption time. Jobs from higher priority queues are dispatched first (this is contrary to UNIX process priority ordering), and jobs from lower priority queues are suspended first when hosts are overloaded.

#### STATUS

The current status of the queue. The possible values are:

##### **Open**

The queue is able to accept jobs.

##### **Closed**

The queue is not able to accept jobs.

##### **Active**

Jobs in the queue may be started.

##### **Inactive**

Jobs in the queue cannot be started for the time being.

At any moment, each queue is either `Open` or `Closed`, and is either `Active` or `Inactive`. The queue can be opened, closed, inactivated and re-activated by the LSF administrator using `badmin` (see `badmin(8)`).

Jobs submitted to a queue that is later closed are still dispatched as long as the queue is active. The queue can also become inactive when either its dispatch window is closed or its run window is closed (see `DISPATCH_WINDOWS` in the “Output for the `-l` Option” section). In this case, the queue cannot be activated using `badmin`.

The queue is re-activated by LSF when one of its dispatch windows and one of its run windows are open again. The initial state of a queue at LSF boot time is set to open, and either active or inactive depending on its windows.

## MAX

The maximum number of job slots that can be used by the jobs from the queue. These job slots are used by dispatched jobs which have not yet finished, and by pending jobs which have slots reserved for them.

A sequential job will use one job slot when it is dispatched to a host, while a parallel job will use as many job slots as is required by `bsub -n` when it is dispatched. See `bsub(1)` for details. If ‘-’ is displayed, there is no limit.

## JL/U

The maximum number of job slots each user can use for jobs in the queue. These job slots are used by your dispatched jobs which have not yet finished, and by pending jobs which have slots reserved for them. If ‘-’ is displayed, there is no limit.

## JL/P

The maximum number of job slots a processor can process from the queue. This includes job slots of dispatched jobs that have not yet finished, and job slots reserved for some pending jobs. The job slot limit per processor (JL/P) controls the number of jobs sent to each host. This limit is configured per processor so that multiprocessor hosts are automatically allowed to run more jobs. If ‘-’ is displayed, there is no limit.

## JL/H

The maximum number of job slots a host can allocate from this queue. This includes the job slots of dispatched jobs that have not yet finished, and those reserved for some pending jobs. The job slot limit per host (JL/H) controls the number of jobs sent to each host, regardless of whether a host is a uniprocessor host or a multiprocessor host. If ‘-’ is displayed, there is no limit.

## NJOBS

The total number of job slots held currently by jobs in the queue. This includes pending, running, suspended and reserved job slots. A parallel job that is running on `n` processors is counted as `n` job slots, since it takes `n` job slots in the queue. See `bjobs(1)` for an explanation of batch job states.

## PEND

The number of job slots used by pending jobs in the queue.

## RUN

The number of job slots used by running jobs in the queue.

## SUSP

The number of job slots used by suspended jobs in the queue.

## Long Output (-l)

In addition to the above fields, the `-l` option displays the following:

### Description

A description of the typical use of the queue.

### Default queue indication

Indicates that this is the default queue.

## PARAMETERS/ STATISTICS

### NICE

## Output

The nice value at which jobs in the queue will be run. This is the UNIX nice value for reducing the process priority (see `nice(1)`).

### **STATUS**

#### **Inactive**

The long format for the `-l` option gives the possible reasons for a queue to be inactive:

#### **Inact\_Win**

The queue is out of its dispatch window or its run window.

#### **Inact\_Adm**

The queue has been inactivated by the LSF administrator.

#### **SSUSP**

The number of job slots in the queue allocated to jobs that are suspended by LSF because of load levels or run windows.

#### **USUSP**

The number of job slots in the queue allocated to jobs that are suspended by the job submitter or by the LSF administrator.

#### **RSV**

The number of job slots in the queue that are reserved by LSF for pending jobs.

## Migration threshold

The length of time in seconds that a job dispatched from the queue will remain suspended by the system before LSF attempts to migrate the job to another host. See the `MIG` parameter in `lsb.queues` and `lsb.hosts`.

## Schedule delay for a new job

The delay time in seconds for scheduling after a new job is submitted. If the schedule delay time is zero, a new scheduling session is started as soon as the job is submitted to the queue. See the `NEW_JOB_SCHED_DELAY` parameter in `lsb.queues`.

## Interval for a host to accept two jobs

The length of time in seconds to wait after dispatching a job to a host before dispatching a second job to the same host. If the job accept interval is zero, a host may accept more than one job in each dispatching interval. See the `JOB_ACCEPT_INTERVAL` parameter in `lsb.queues` and `lsb.params`.

## RESOURCE LIMITS

The hard resource usage limits that are imposed on the jobs in the queue (see `getrlimit(2)` and `lsb.queues(5)`). These limits are imposed on a per-job and a per-process basis.

The possible per-job limits are:

### **CPULIMIT**

The maximum CPU time a job can use, in minutes, relative to the CPU factor of the named host. CPULIMIT is scaled by the CPU factor of the execution host so that jobs are allowed more time on slower hosts.

When the job-level CPULIMIT is reached, a SIGXCPU signal is sent to all processes belonging to the job. If the job has no signal handler for SIGXCPU, the job is killed immediately. If the SIGXCPU signal is handled, blocked, or ignored by the application, then after the grace period expires, LSF sends SIGINT, SIGTERM, and SIGKILL to the job to kill it.

#### **PROCLIMIT**

The maximum number of processors allocated to a job. Jobs that request fewer slots than the minimum PROCLIMIT or more slots than the maximum PROCLIMIT are rejected. If the job requests minimum and maximum job slots, the maximum slots requested cannot be less than the minimum PROCLIMIT, and the minimum slots requested cannot be more than the maximum PROCLIMIT.

#### **MEMLIMIT**

The maximum running set size (RSS) of a process. If a process uses more memory than the limit allows, its priority is reduced so that other processes are more likely to be paged in to available memory. This limit is enforced by the `setrlimit` system call if it supports the `RLIMIT_RSS` option.

By default, the limit is shown in KB. Use `LSF_UNIT_FOR_LIMITS` in `lsf.conf` to specify a larger unit for display (MB, GB, TB, PB, or EB).

#### **SWAPLIMIT**

The swap space limit that a job may use. If SWAPLIMIT is reached, the system sends the following signals in sequence to all processes in the job: SIGINT, SIGTERM, and SIGKILL.

By default, the limit is shown in KB. Use `LSF_UNIT_FOR_LIMITS` in `lsf.conf` to specify a larger unit for display (MB, GB, TB, PB, or EB).

#### **PROCESSLIMIT**

The maximum number of concurrent processes allocated to a job. If PROCESSLIMIT is reached, the system sends the following signals in sequence to all processes belonging to the job: SIGINT, SIGTERM, and SIGKILL.

#### **THREADLIMIT**

The maximum number of concurrent threads allocated to a job. If THREADLIMIT is reached, the system sends the following signals in sequence to all processes belonging to the job: SIGINT, SIGTERM, and SIGKILL.

The possible UNIX per-process resource limits are:

#### **RUNLIMIT**

The maximum wall clock time a process can use, in minutes. RUNLIMIT is scaled by the CPU factor of the execution host. When a job has been in the RUN state for a total of RUNLIMIT minutes, LSF sends a SIGUSR2 signal to the job. If the job does not exit within 5 minutes, LSF sends a SIGKILL signal to kill the job.

#### **FILELIMIT**

The maximum file size a process can create, in KB. This limit is enforced by the UNIX `setrlimit` system call if it supports the `RLIMIT_FSIZE` option, or the `ulimit` system call if it supports the `UL_SETFSIZE` option.

#### **DATALIMIT**

The maximum size of the data segment of a process, in KB. This restricts the amount of memory a process can allocate. `DATALIMIT` is enforced by the `setrlimit` system call if it supports the `RLIMIT_DATA` option, and unsupported otherwise.

#### **STACKLIMIT**

The maximum size of the stack segment of a process. This limit restricts the amount of memory a process can use for local variables or recursive function calls. `STACKLIMIT` is enforced by the `setrlimit` system call if it supports the `RLIMIT_STACK` option.

By default, the limit is shown in KB. Use `LSF_UNIT_FOR_LIMITS` in `lsf.conf` to specify a larger unit for display (MB, GB, TB, PB, or EB).

#### **CORELIMIT**

The maximum size of a core file. This limit is enforced by the `setrlimit` system call if it supports the `RLIMIT_CORE` option.

If a job submitted to the queue has any of these limits specified (see `bsub(1)`), then the lower of the corresponding job limits and queue limits are used for the job.

If no resource limit is specified, the resource is assumed to be unlimited.

By default, the limit is shown in KB. Use `LSF_UNIT_FOR_LIMITS` in `lsf.conf` to specify a larger unit for display (MB, GB, TB, PB, or EB).

## SCHEDULING PARAMETERS

The scheduling and suspending thresholds for the queue.

The scheduling threshold `loadSched` and the suspending threshold `loadStop` are used to control batch job dispatch, suspension, and resumption. The queue thresholds are used in combination with the thresholds defined for hosts (see `bhosts(1)` and `lsb.hosts(5)`). If both queue level and host level thresholds are configured, the most restrictive thresholds are applied.

The `loadSched` and `loadStop` thresholds have the following fields:

#### **r15s**

The 15-second exponentially averaged effective CPU run queue length.

#### **r1m**

The 1-minute exponentially averaged effective CPU run queue length.

#### **r15m**

The 15-minute exponentially averaged effective CPU run queue length.

#### **ut**

The CPU utilization exponentially averaged over the last minute, expressed as a percentage between 0 and 1.

#### **pg**

The memory paging rate exponentially averaged over the last minute, in pages per second.

**io**

The disk I/O rate exponentially averaged over the last minute, in KB per second.

**ls**

The number of current login users.

**it**

On UNIX, the idle time of the host (keyboard not touched on all logged in sessions), in minutes.

On Windows, the `it` index is based on the time a screen saver has been active on a particular host.

**tmp**

The amount of free space in `/tmp`, in MB.

**swp**

The amount of currently available swap space. By default, swap space is shown in MB. Use `LSF_UNIT_FOR_LIMITS` in `lsf.conf` to specify a larger unit for display (MB, GB, TB, PB, or EB).

**mem**

The amount of currently available memory. By default, memory is shown in MB. Use `LSF_UNIT_FOR_LIMITS` in `lsf.conf` to specify a larger unit for display (MB, GB, TB, PB, or EB).

**cpuspeed**

The speed of each individual cpu, in megahertz (MHz).

**bandwidth**

The maximum bandwidth requirement, in megabits per second (Mbps).

In addition to these internal indices, external indices are also displayed if they are defined in `lsb.queues` (see `lsb.queues(5)`).

The `loadSched` threshold values specify the job dispatching thresholds for the corresponding load indices. If `'-'` is displayed as the value, it means the threshold is not applicable. Jobs in the queue may be dispatched to a host if the values of all the load indices of the host are within (below or above, depending on the meaning of the load index) the corresponding thresholds of the queue and the host. The same conditions are used to resume jobs dispatched from the queue that have been suspended on this host.

Similarly, the `loadStop` threshold values specify the thresholds for job suspension. If any of the load index values on a host go beyond the corresponding threshold of the queue, jobs in the queue will be suspended.

## JOB EXCEPTION PARAMETERS

Configured job exception thresholds and number of jobs in each exception state for the queue.

`Threshold` and `NumOfJobs` have the following fields:

**overrun**

Configured threshold in minutes for overrun jobs, and the number of jobs in the queue that have triggered an overrun job exception by running longer than the overrun threshold

**underrun**

Configured threshold in minutes for underrun jobs, and the number of jobs in the queue that have triggered an underrun job exception by finishing sooner than the underrun threshold

**idle**

Configured threshold (CPU time/runtime) for idle jobs, and the number of jobs in the queue that have triggered an overrun job exception by having a job idle factor less than the threshold

## SCHEDULING POLICIES

Scheduling policies of the queue. Optionally, one or more of the following policies may be configured:

**APS\_PRIORITY**

Absolute Priority Scheduling is enabled. Pending jobs in the queue are ordered according to the calculated APS value.

**FAIRSHARE**

Queue-level fairshare scheduling is enabled. Jobs in this queue are scheduled based on a fairshare policy instead of the first-come, first-serve (FCFS) policy.

**BACKFILL**

A job in a backfill queue can use the slots reserved by other jobs if the job can run to completion before the slot-reserving jobs start.

Backfilling does not occur on queue limits and user limit but only on host based limits. That is, backfilling is only supported when MXJ, JL/U, JL/P, PJOB\_LIMIT, and HJOB\_LIMIT are reached. Backfilling is not supported when MAX\_JOBS, QJOB\_LIMIT, and UJOB\_LIMIT are reached.

**IGNORE\_DEADLINE**

If IGNORE\_DEADLINE is set to Y, starts all jobs regardless of the run limit.

**EXCLUSIVE**

Jobs dispatched from an exclusive queue can run exclusively on a host if the user so specifies at job submission time (see `bsub(1)`). Exclusive execution means that the job is sent to a host with no other batch job running there, and no further job, batch or interactive, will be dispatched to that host while the job is running. The default is not to allow exclusive jobs.

**NO\_INTERACTIVE**

This queue does not accept batch interactive jobs. (see the `-I`, `-Is`, and `-Ip` options of `bsub(1)`). The default is to accept both interactive and non-interactive jobs.

**ONLY\_INTERACTIVE**

This queue only accepts batch interactive jobs. Jobs must be submitted using the `-I`, `-Is`, and `-Ip` options of `bsub(1)`. The default is to accept both interactive and non-interactive jobs.

## FAIRSHARE\_QUEUES

Lists queues participating in cross-queue fairshare. The first queue listed is the master queue—the queue in which fairshare is configured; all other queues listed inherit the fairshare policy from the master queue. Fairshare information applies to all the jobs running in all the queues in the master-slave set.

## QUEUE\_GROUP

Lists queues participating in an absolute priority scheduling (APS) queue group. If both FAIRSHARE and APS\_PRIORITY are enabled in the same queue, the FAIRSHARE\_QUEUES are not displayed. These queues are instead displayed as QUEUE\_GROUP.

## DISPATCH\_ORDER

DISPATCH\_ORDER=QUEUE is set in the master queue. Jobs from this queue are dispatched according to the order of queue priorities first, then user fairshare priority. Within the queue, dispatch order is based on user share quota. This avoids having users with higher fairshare priority getting jobs dispatched from low-priority queues.

## USER\_SHARES

A list of `[user_name, share]` pairs. `user_name` is either a user name or a user group name. `share` is the number of shares of resources assigned to the user or user group. A party will get a portion of the resources proportional to that party's share divided by the sum of the shares of all parties specified in this queue.

## DEFAULT\_HOST SPECIFICATION

The default host or host model that will be used to normalize the CPU time limit of all jobs.

If you want to view a list of the CPU factors defined for the hosts in your cluster, see `lsinfo(1)`. The CPU factors are configured in `lsf.shared(5)`.

The appropriate CPU scaling factor of the host or host model is used to adjust the actual CPU time limit at the execution host (see `CPULIMIT` in `lsb.queues(5)`). The `DEFAULT_HOST_SPEC` parameter in `lsb.queues` overrides the system `DEFAULT_HOST_SPEC` parameter in `lsb.params` (see `lsb.params(5)`). If a user explicitly gives a host specification when submitting a job using `bsub -c cpu_limit[/host_name | /host_model]`, the user specification overrides the values defined in both `lsb.params` and `lsb.queues`.

## RUN\_WINDOWS

The time windows in a week during which jobs in the queue may run.

When a queue is out of its window or windows, no job in this queue will be dispatched. In addition, when the end of a run window is reached, any running jobs from this queue are suspended until the beginning of the next run window, when they are resumed. The default is no restriction, or always open.

## DISPATCH\_WINDOWS

Dispatch windows are the time windows in a week during which jobs in the queue may be dispatched.

When a queue is out of its dispatch window or windows, no job in this queue will be dispatched. Jobs already dispatched are not affected by the dispatch windows. The default is no restriction, or always open (that is, twenty-four hours a day, seven days a week). Note that such windows are only applicable to batch jobs. Interactive jobs scheduled by LIM are controlled by another set of dispatch windows (see `lshosts(1)`). Similar dispatch windows may be configured for individual hosts (see `bhosts(1)`).

A window is displayed in the format *begin\_time–end\_time*. Time is specified in the format [*day*:]*hour*[:*minute*], where all fields are numbers in their respective legal ranges: 0(Sunday)-6 for *day*, 0-23 for *hour*, and 0-59 for *minute*. The default value for *minute* is 0 (on the hour). The default value for *day* is every day of the week. The *begin\_time* and *end\_time* of a window are separated by ‘–’, with no blank characters (SPACE and TAB) in between. Both *begin\_time* and *end\_time* must be present for a window. Windows are separated by blank characters.

## USERS

A list of users allowed to submit jobs to this queue. LSF administrators can submit jobs to the queue even if they are not listed here.

User group names have a slash (/) added at the end of the group name. See `bugroup(1)`.

If the fairshare scheduling policy is enabled, users cannot submit jobs to the queue unless they also have a share assignment. This also applies to LSF administrators.

## HOSTS

A list of hosts where jobs in the queue can be dispatched.

Host group names have a slash (/) added at the end of the group name. See `bmgroup(1)`.

## NQS DESTINATION QUEUES

A list of NQS destination queues to which this queue can dispatch jobs.

When you submit a job using `bsub -q queue_name`, and the specified queue is configured to forward jobs to the NQS system, LSF routes your job to one of the NQS destination queues. The job runs on an NQS batch server host, which is not a member of the LSF cluster. Although running on an NQS system outside the LSF cluster, the job is still managed by LSF in almost the same way as jobs running inside the LSF cluster. Thus, you may have your batch jobs transparently sent to an NQS system to run and then get the results of your jobs back. You may use any supported user interface, including LSF commands and NQS commands (see `lnqs(1)`) to submit, monitor, signal and delete your batch jobs that are running in an NQS system. See `lsb.queues(5)` and `bsub(1)` for more information.

## ADMINISTRATORS

A list of queue administrators. The users whose names are specified here are allowed to operate on the jobs in the queue and on the queue itself. See `lsb.queues(5)` for more information.

**PRE\_EXEC** The `PRE_EXEC` command runs on the execution host before the job associated with the queue is dispatched to the execution host (or to the first host selected for a parallel batch job).

**POST\_EXEC** The post-execution command for the queue. The `POST_EXEC` command runs on the execution host after the job finishes.

### **REQUEUE\_EXIT\_VALUES**

Jobs that exit with these values are automatically requeued. See `lsb.queues(5)` for more information.

**RES\_REQ** Resource requirements of the queue. Only the hosts that satisfy these resource requirements can be used by the queue.

### **Maximum slot reservation time**

The maximum time in seconds a slot is reserved for a pending job in the queue. See the `SLOT_RESERVE=MAX_RESERVE_TIME[n]` parameter in `lsb.queues`.

**RESUME\_COND** The conditions that must be satisfied to resume a suspended job on a host. See `lsb.queues(5)` for more information.

**STOP\_COND** The conditions which determine whether a job running on a host should be suspended. See `lsb.queues(5)` for more information.

**JOB\_STARTER** An executable file that runs immediately prior to the batch job, taking the batch job file as an input argument. All jobs submitted to the queue are run via the job starter, which is generally used to create a specific execution environment before processing the jobs themselves. See `lsb.queues(5)` for more information.

**CHUNK\_JOB\_SIZE** Chunk jobs only. Specifies the maximum number of jobs allowed to be dispatched together in a chunk job. All of the jobs in the chunk are scheduled and dispatched as a unit rather than individually. The ideal candidates for job chunking are jobs that typically takes 1 to 2 minutes to run.

**SEND\_JOBS\_TO** MultiCluster. List of remote queue names to which the queue forwards jobs.

### **RECEIVE\_JOBS\_FROM**

MultiCluster. List of remote cluster names from which the queue receives jobs.

### **PREEMPTION**

#### **PREEMPTIVE**

The queue is preemptive. Jobs in this queue may preempt running jobs from lower-priority queues, even if the lower-priority queues are not specified as preemptive.

#### **PREEMPTABLE**

The queue is preemptable. Running jobs in this queue may be preempted by jobs in higher-priority queues, even if the higher-priority queues are not specified as preemptive.

## Output

### RERUNNABLE

If the RERUNNABLE field displays *yes*, jobs in the queue are rerunnable. That is, jobs in the queue are automatically restarted or rerun if the execution host becomes unavailable. However, a job in the queue will not be restarted if you have removed the rerunnable option from the job. See `lsb.queues(5)` for more information.

### CHECKPOINT

If the CHKPNTDIR field is displayed, jobs in the queue are checkpointable. Jobs will use the default checkpoint directory and period unless you specify other values. Note that a job in the queue will not be checkpointed if you have removed the checkpoint option from the job. See `lsb.queues(5)` for more information.

#### CHKPNTDIR

Specifies the checkpoint directory using an absolute or relative path name.

#### CHKPNTPERIOD

Specifies the checkpoint period in seconds.

Although the output of `bqueues` reports the checkpoint period in seconds, the checkpoint period is defined in minutes (the checkpoint period is defined through the `bsub -k "checkpoint_dir []"` option, or in `lsb.queues`).

### JOB CONTROLS

The configured actions for job control. See JOB\_CONTROLS parameter in `lsb.queues`.

The configured actions are displayed in the format `[action_type, command]` where *action\_type* is either SUSPEND, RESUME, or TERMINATE.

### ADMIN ACTION COMMENT

If the LSF administrator specified an administrator comment with the `-C` option of the queue control commands `qclose`, `qopen`, `qact`, and `qinact`, `qhist` the comment text is displayed.

### SLOT\_SHARE

Share of job slots for queue-based fairshare. Represents the percentage of running jobs (job slots) in use from the queue. SLOT\_SHARE must be greater than zero.

The sum of SLOT\_SHARE for all queues in the pool does not need to be 100%. It can be more or less, depending on your needs.

### SLOT\_POOL

Name of the pool of job slots the queue belongs to for queue-based fairshare. A queue can only belong to one pool. All queues in the pool must share the same set of hosts.

## Recursive Share Tree Output (-r)

In addition to the fields displayed for the `-l` option, the `-r` option displays the following:

### SCHEDULING POLICIES

#### FAIRSHARE

The `-r` option causes `bqueues` to recursively display the entire share information tree associated with the queue.

## See Also

[bugroup\(1\)](#), [nice\(1\)](#), [getrlimit\(2\)](#), [lsb.queues\(5\)](#), [bsub\(1\)](#), [bjobs\(1\)](#), [bhosts\(1\)](#),  
[badmin\(8\)](#), [mbatchd\(8\)](#)

bread

# bread

reads messages and attached data files from a job

## Synopsis

```
bread [-i message_index] [-a file_name]  
      job_ID | "job_ID[index]" | -J job_name  
bread [-h | -V]
```

## Description

Reads messages and data posted to an unfinished job with `bpost`.

By default, displays the message description text of the job. By default, operates on the message with index 0.

You can read messages and data from a job until it is cleaned from the system. You cannot read messages and data from done or exited jobs.

If a you specify a job ID:

- ◆ You can get read messages of jobs submitted by other users, but you cannot read data files attached to jobs submitted by other users.
- ◆ You can only read data files attached to your own jobs.
- ◆ Root and LSF administrators can read messages of jobs submitted by other users.
- ◆ Root and LSF administrators cannot read data files attached to jobs submitted by other users.

Job names are not unique; if you specify `-J job_name`:

- ◆ You only can read messages and data from your own jobs.
- ◆ You cannot read messages and data from jobs submitted by other users.
- ◆ Root and the LSF administrators can only read messages and data from their own jobs.

The command:

```
bstatus
```

is equivalent to:

```
bread -i 0
```

## Options

**-a *file\_name*** Gets the text message and copies the data file attached to the specified message index of the job to the file specified by *file\_name*. Data files cannot be attached to MultiCluster jobs.

If you do not specify a message index, copies the attachment of message index 0 to the file. The job must have an attachment, and you must specify a name for the file you are copying the attachment to. If the file already exists, `-a` overwrites it with the new file.

By default, `-a` gets the attachment file from the directory specified by the `JOB_ATTA_DIR` parameter. If `JOB_ATTA_DIR` is not specified, job message attachments are saved in `LSB_SHAREDIR/info/`.

**-i *message\_index*** Specifies the message index to be retrieved.  
Default: 0

***job\_ID* | "*job\_ID[index]*" | -J *job\_name***

Required. Specify the job to operate on.

**-h** Prints command usage to `stderr` and exits.

**-v** Prints LSF release version to `stderr` and exits.

## Example

```
bpost -i 1 -d "step 1" -a step1.out 2500
```

```
bread -i 1 -a step2.in 2500
```

JOBID	MSG_ID	FROM	POST_TIME	DESCRIPTION
2500	1	user1	May 19 13:59	step 1

Displays the message description text `step 1` for message index 1 of job 2500 and copies the data in the file `step1.out` attached to message 1 to the file `step2.in`.

## See Also

[bpost\(1\)](#), [bstatus\(1\)](#), [bsub\(1\)](#), `JOB_ATTA_DIR`

# brequeue

kills and requeues a job

## Synopsis

```
brequeue [-J job_name | -J "job_name[index_list]"] [ -u user_name |
  -u all ] [ job_ID | "job_ID[index_list]" ] [-d] [-e] [-r] [-a]
  [-H]
```

```
brequeue [-h | -V]
```

## Description

You can only use `brequeue` on a job you own, unless you are `root` or the LSF administrator.

Kills a running (RUN), user-suspended (USUSP), or system-suspended (SSUSP) job and returns it to the queue. A job that is killed and requeued retains its submit time but is dispatched according to its requeue time. When the job is requeued, it is assigned the PEND status or PSUSP if the `-H` option is used. Once dispatched, the job starts over from the beginning. The requeued job keeps the same job ID.

When `JOB_INCLUDE_POSTPROC=Y` is set in `lsb.params` or in an application profile in `lsb.applications`, job requeue will happen only after post-execution processing, not when the job finishes.

Use `brequeue` to requeue job arrays or job array elements.

By default, kills and requeues your most recently submitted job when no job ID is specified.

With MultiCluster, you can only use `brequeue` on jobs in local queues. A job that is killed and requeued is assigned a new job ID on the cluster in which it is executed, but it retains the same job ID on the cluster from which it was submitted. For example, a job from cluster A that is killed and requeued and then run on cluster B will be assigned a new job ID on cluster B. However, when the `bjobs` command is used from cluster A, the submitting cluster, the job will be displayed with the original job ID. When the `bjobs` command is used from cluster B, the execution cluster, the job will be displayed with the new job ID.

When absolute job priority scheduling (APS) is configured in the queue, all requeued jobs are treated as newly submitted jobs for APS calculation. The job priority, system, and ADMIN APS factors are reset on requeue.

## Options

- a** Requeues all jobs including running jobs, suspending jobs, and jobs with EXIT or DONE status.
- d** Requeues jobs that have finished running with DONE job status.
- e** Requeues jobs that have terminated abnormally with EXIT job status.
- H** Requeues jobs to PSUSP job status.
- r** Requeues jobs that are running.

**-J *job\_name* | -J "*job\_name[index\_list]*"**

Operates on the specified job.

Since job names are not unique, multiple job arrays may have the same name with a different or same set of indices.

**-u *user\_name* | -u all** Operates on the specified user's jobs or all jobs. To specify a Windows user account, include the domain name in uppercase letters and use a single backslash (*DOMAIN\_NAME\user\_name*) in a Windows command line or a double backslash (*DOMAIN\_NAME\\user\_name*) in a UNIX command line.

Only `root` and LSF administrators can requeue jobs submitted by other users.

***job\_ID* | "*job\_ID[index\_list]*"**

Operates on the specified job or job array elements.

The value of 0 for *job\_ID* is ignored.

**-h** Prints command usage to `stderr` and exits.

**-v** Prints LSF release version to `stderr` and exits.

## Limitations

`brequeue` cannot be used on interactive batch jobs; `brequeue` only kills interactive batch jobs, it does not restart them.

# bresources

displays information about resource reservation and resource limits configuration

## Synopsis

```
bresources [-s] [resource_name ...]
```

```
bresources [-h | -V]
```

## Description

By default, `bresources` displays all resource configurations in `lsb.resources`. This is the same as `blimits -c`.

## Options

- s** Displays per-resource reservation configurations from the `ReservationUsage` section of `lsb.resources`. For example:

```
bresources -s
Begin ReservationUsage
RESOURCE          METHOD
licenseX          PER_JOB
licenseY          PER_HOST
licenseZ          PER_SLOT
End ReservationUsage
```

- resource\_name* ...** Only displays information about the specified resource. For example:

```
bresources -s licenseZ
RESOURCE          METHOD
licenseZ          PER_SLOT
```

- h** Prints command usage to `stderr` and exits.
- V** Prints LSF release version to `stderr` and exits.

# brestart

restarts checkpointed jobs

## Synopsis

```
brestart [bsub_options] [-f] checkpoint_dir
        [job_ID | "job_ID[index]"]
brestart [-h | -V]
```

## Option List

- B
- f
- N
- x
- b *begin\_time*
- C *core\_limit*
- c [*hour:*] *minute*[/*host\_name* | /*host\_model*]
- D *data\_limit*
- E "*pre\_exec\_command* [*argument* ...]"
- F *file\_limit*
- m "*host\_name*[+[*pref\_level*]] | *host\_group*[+[*pref\_level*]] ..."
- G *user\_group*
- M *mem\_limit*
- q "*queue\_name* ..."
- S *stack\_limit*
- t *term\_time*
- w '*dependency\_expression*'
- W *run\_limit*[/*host\_name* | /*host\_model*]

*checkpoint\_dir* [*job\_ID* | "*job\_ID*[*index*]"]

## Description

Restarts a checkpointed job using the checkpoint files saved in *checkpoint\_dir/last\_job\_ID/*. Only jobs that have been successfully checkpointed can be restarted.

Jobs are re-submitted and assigned a new job ID. The checkpoint directory is renamed using the new job ID, *checkpoint\_dir/new\_job\_ID/*.

By default, jobs are restarted with the same output file and file transfer specifications, job name, window signal value, checkpoint directory and period, and rerun options as the original job.

## Options

To restart a job on another host, both hosts must be binary compatible, run the same OS version, have access to the executable, have access to all open files (LSF must locate them with an absolute path name), and have access to the checkpoint directory.

The environment variable `LSB_RESTART` is set to `Y` when a job is restarted.

LSF invokes the `erestart(8)` executable found in `LSF_SERVERDIR` to perform the restart.

Only the `bsub` options listed here can be used with `brestart`.

Like `bsub`, `brestart` calls the master `esub` (`mesub`), which invokes any mandatory `esub` executables configured by an LSF administrator, and any executable named `esub` (without `.application`) if it exists in `LSF_SERVERDIR`. Only `esub` executables invoked by `bsub` can change the job environment on the submission host. An `esub` invoked by `brestart` cannot change the job environment.

## Options

The following option applies only to `brestart`.

- f** Forces the job to be restarted even if non-restartable conditions exist (these conditions are operating system specific).

See `bsub(1)` for a description of all other options.

## Limitations

In kernel-level checkpointing, you cannot change the value of `core limit`, `CPU limit`, `stack limit` or `memory limit` with `brestart`.

## See Also

`bsub(1)`, `bjobs(1)`, `bmod(1)`, `bqueues(1)`, `bhosts(1)`, `bchkpnt(1)`, `lsbqueues(5)`, `echkpnt(8)`, `erestart(8)`, `mbatchd(8)`

# bresume

resumes one or more suspended jobs

## Synopsis

```
bresume [-app application_profile_name] [-g job_group_name]
        [-J job_name] [-m host_name] [-q queue_name]
        [-sla service_class_name] [-u user_name | -u user_group |
        -u all] [0]
bresume [job_ID | "job_ID[index_list]"] ...
bresume [-h | -V]
```

## Description

Sends the SIGCONT signal to resume one or more of your suspended jobs.

Only `root` and LSF administrators can operate on jobs submitted by other users. You cannot resume a job that is not suspended. Using `bresume` on a job that is not in either the PSUSP or the USUSP state has no effect.

You must specify a job ID or `-g`, `-J`, `-m`, `-u`, or `-q`. You cannot resume a job that is not suspended. Specify `-0` (zero) to resume multiple jobs.

You can also use `bkill -s CONT` to send the resume signal to a job.

If a signal request fails to reach the job execution host, LSF will retry the operation later when the host becomes reachable. LSF retries the most recent signal request.

Jobs that are suspended by the administrator can only be resumed by the administrator or `root`; users do not have permission to resume a job suspended by another user or the administrator. Administrators or `root` can resume jobs suspended by users or administrators.

## ENABLE\_USER\_RESUME parameter (lsb.params)

If `ENABLE_USER_RESUME=Y` in `lsb.params`, users can resume their own jobs that have been suspended by the administrator.

## Options

**0** Resumes all the jobs that satisfy other options (`-g`, `-m`, `-q`, `-u`, and `-J`).

**-app *application\_profile\_name***

Resumes only jobs associated with the specified application profile. You must specify an existing application profile.

**-g *job\_group\_name*** Resumes only jobs in the specified job group.

**-J *job\_name*** Resumes only jobs with the specified name.

**-m *host\_name*** Resumes only jobs dispatched to the specified host.

**-q *queue\_name*** Resumes only jobs in the specified queue.

**-sla *service\_class\_name***

Resume jobs belonging to the specified service class.

## Examples

Use `bsla` to display the properties of service classes configured in `LSB_CONFDIR/cluster_name/configdir/lsb.serviceclasses` (see `lsb.serviceclasses(5)`) and dynamic information about the state of each configured service class.

**-u *user\_name* | -u *user\_group* | -u all**

Resumes only jobs owned by the specified user or group, or all users if the reserved user name `all` is specified. To specify a Windows user account, include the domain name in uppercase letters and use a single backslash (`DOMAIN_NAME\user_name`) in a Windows command line or a double backslash (`DOMAIN_NAME\\user_name`) in a UNIX command line.

***job\_ID* ... | "*job\_ID[index\_list]*" ...**

Resumes only the specified jobs. Jobs submitted by any user can be specified here without using the `-u` option.

- h** Prints command usage to `stderr` and exits.
- v** Prints LSF release version to `stderr` and exits.

## Examples

```
brresume -q night 0
```

Resumes all of the user's suspended jobs that are in the `night` queue. If the user is the LSF administrator, resumes all suspended jobs in the `night` queue.

```
brresume -g /risk_group 0
```

Resumes all suspended jobs in the job group `/risk_group`.

## See Also

[bsub\(1\)](#), [bjobs\(1\)](#), [bqueues\(1\)](#), [bhosts\(1\)](#), [bstop\(1\)](#), [bkill\(1\)](#), [bgadd\(1\)](#), [bgdel\(1\)](#), [bjgroup\(1\)](#), [bparams\(1\)](#), [bapp\(1\)](#), [mbatchd\(8\)](#), [kill\(1\)](#), [signal\(2\)](#) [lsb.params\(5\)](#), [lsb.applications\(5\)](#)

# brlinfo

displays host topology information

## Synopsis

```
brlinfo [-l] [host_name ...]
```

```
brlinfo [-h | -V]
```

## Description

`brlinfo` contacts the Platform LSF HPC topology adapter (RLA) on the specified host and presents topology information to the user. By default, displays information about all hosts running RLA.

## Options

- l** Long format. Displays additional host topology information. See [Output](#) on page 149 for a description of information that is displayed.
- host\_name* ...** Only displays information about the specified host.
- h** Prints command usage to `stderr` and exits.
- V** Prints LSF release version to `stderr` and exits.

## Output

### Default output

Displays the following fields:

HOSTNAME	Name of the host running RLA
CPUSET_OS	RLA host operating system
NCPUS	Total number of CPUs
FREECPU	Number of free CPUs
NNODES	Number of nodes allocated
NCPU/NODE	Number of CPUs per node
NSTATIC_CPUSSETS	Number of static cpusets allocated

### Long output (-l)

The `-l` option displays a long format listing with the following additional fields:

FREE CPU LIST	List of free CPUs in the cpuset
---------------	---------------------------------

For example:

```
0-2
```

## Examples

### NFREECPUS ON EACH NODE

Number of free CPUs on each node

For example:

2/0,1/1

### STATIC CPUSETS

List of static cpuset names

For example:

NO STATIC CPUSETS

### CPU\_RADIUS

Available CPUs with a given radius. CPU radius is determined by the processor topology of the system and is expressed in terms of the number of router hops between CPUs. The CPU radius is displayed as a comma-separated list of the number of free CPUs available with radius 0, radius 1, radius 2, and so on:

For example:

2,3,3,3,3,3,3,3

- ◆ 2 CPUs are available within radius 0
- ◆ 3 CPUs are available within radius 1, 2, 3, 4, 5, 6, and 7.

CPUs grouped within a smaller radius can be thought of as being closer together and therefore have better communications performance.

## Examples

```
brlinfo hostA hostB hostC
HOSTNAME      CPUSET_OS  NCPUS  NFREECPU  NNODES  NCPU/NODE  NSTATIC_CPUSETS
hostA         SGI_IRIX  2      2          1        2          0
hostB         PROPACK_4 4      4          2        2          0
hostC         PROPACK_4 4      3          2        2          0
```

```
brlinfo -l
HOST: hostC
CPUSET_OS  NCPUS  NFREECPU  NNODES  NCPU/NODE  NSTATIC_CPUSETS
PROPACK_4  4      3          2        2          0
FREE CPU LIST: 0-2
NFREECPU ON EACH NODE: 2/0,1/1
STATIC CPUSETS: NO STATIC CPUSETS
CPU_RADIUS: 2,3,3,3,3,3,3,3
```

# brsvadd

adds an advance reservation

## Synopsis

```
brsvadd [-o] -n processors | -s [-n processors]  
        -m "host_name | host_group ..." [-R "res_req"]  
        [-u user_name | -g group_name] -b begin_time -e end_time  
brsvadd [-o] -n processors | -s [-n processors]  
        -m "host_name | host_group ..." [-R "res_req"]  
        [-u user_name | -g group_name] -t time_window  
brsvadd [-o] -n processors | -s [-n processors] -R "res_req"  
        [-u user_name | -g group_name] -b begin_time -e end_time  
brsvadd [-o] -n processors | -s [-n processors] -R "res_req"  
        [-u user_name | -g group_name] -t time_window  
brsvadd [-h | -V]
```

## Description

**CAUTION:** By default, this command can only be used by LSF administrators or root.

Reserves processors in advance for a specified period of time for a user or user group, or for system maintenance purposes. Use `-b` and `-e` for one-time reservations, and `-t` for recurring reservations.

To allow users to create their own advance reservations without administrator intervention, configure advance reservation policies in the ResourceReservation section of `lsb.resources`.

Only administrators, root, or the users listed in the ResourceReservation section can add reservations for themselves or any other user or user group.

## Options

- o** Creates an open advance reservation. A job with an open advance reservation will only have the advance reservation property during the reservation window, after which the job becomes a normal job, not subject to termination when the reservation window closes.

This prevents jobs from being killed if the reservation window is too small. Instead, the job is suspended and normal scheduling policies apply after the reservation window.

- s** Creates a reservation for system use. LSF does not dispatch jobs to the specified hosts while the reservation is active.

When specifying a system reservation with `-s`, you do not need to specify the number of processors to reserve with the `-n` option.

**-b *begin\_time*** Begin time for a one-time reservation. The begin time is in the form  
[[*year*:]*month*:]*day*:]*hour*:*minute*

with the following ranges:

- ◆ *year*: any year after 1900 (YYYY)
- ◆ *month*: 1-12 (MM)
- ◆ *day of the month*: 1-31 (dd)
- ◆ *hour*: 0-23 (hh)
- ◆ *minute*: 0-59 (mm)

You must specify at least hour:minute. Year, month, and day are optional. Three fields are assumed to be day:hour:minute, four fields are assumed to be month:day:hour:minute, and five fields are year:month:day:hour:minute.

If you do not specify a day, LSF assumes the current day. If you do not specify a month, LSF assumes the current month. If you specify a year, you must specify a month.

The time value for `-b` must use the same syntax as the time value for `-e`. It must be earlier than the time value for `-e`, and cannot be earlier than the current time.

**-e *end\_time*** End time for a one-time reservation. The end time is in the form

`[[year:]month:]day:]hour:minute`

with the following ranges:

- ◆ *year*: any year after 1900 (YYYY)
- ◆ *month*: 1-12 (MM)
- ◆ *day of the month*: 1-31 (dd)
- ◆ *hour*: 0-23 (hh)
- ◆ *minute*: 0-59 (mm)

You must specify at least hour:minute. Year, month, and day are optional. Three fields are assumed to be day:hour:minute, four fields are assumed to be month:day:hour:minute, and five fields are year:month:day:hour:minute.

If you do not specify a day, LSF assumes the current day. If you do not specify a month, LSF assumes the current month. If you specify a year, you must specify a month.

The time value for `-e` must use the same syntax as the time value for `-b`. It must be later than the time value for `-b`.

**-g *group\_name*** Creates a reservation for a user group.

The `-g group_name` option does not support the `@cluster` notation for advance reservations on remote clusters.

**-m "*host\_name* | *host\_group* ..."**

List of hosts for which processors specified with `-n` are reserved. At job submission, LSF considers the hosts in the specified order.

If you also specify a resource requirement string with the `-R` option, `-m` is optional.

The hosts can be local to the cluster or hosts leased from remote clusters.

**-n *processors*** Number of processors to reserve. *processors* must be less than or equal to the actual number of CPUs for the hosts selected by `-m` or `-R` for the reservation.

If you also specify the reservation for system use with the `-s` option, `-n` is optional.

**-R "res\_req"** Selects hosts for the reservation according to the specified resource requirements. Only hosts that satisfy the resource requirement expression are reserved. -R accepts any valid resource requirement string, but only the select string takes effect.

If you also specify a host list with the -m option, -R is optional.

For more information about resource requirements, see `lsfintr(1)`.

The size of the resource requirement string is limited to 512 bytes.

**-t time\_window** Time window for a recurring reservation.

To specify a time window, specify two time values separated by a hyphen (-), with no space in between:

```
time_window = begin_time-end_time
```

Times are specified in the format:

```
[day:]hour[:minute]
```

where all fields are numbers with the following ranges:

- ◆ *day of the week*: 0-6 (0 is Sunday)
- ◆ *hour*: 0-23
- ◆ *minute*: 0-59

Specify a time window one of the following ways:

- ◆ *hour-hour*
- ◆ *hour:minute-hour:minute*
- ◆ *day:hour:minute-day:hour:minute*

The default value for minute is 0 (on the hour); the default value for day is every day of the week.

You must specify at least the hour. Day of the week and minute are optional. Both the start time and end time values must use the same syntax. If you do not specify a minute, LSF assumes the first minute of the hour (:00). If you do not specify a day, LSF assumes every day of the week. If you do specify the day, you must also specify the minute.

You can specify multiple time windows, but they cannot overlap. For example:

```
timeWindow(8:00-14:00 18:00-22:00)
```

is correct, but

```
timeWindow(8:00-14:00 11:00-15:00)
```

is not valid.

LSF administrators can prevent running jobs from being killed when the reservation expires by changing the termination time of the job using the reservation (`bmod -t`) before the reservation window closes.

When the job starts running, the run limit of the reservation is set to the minimum of the job run limit (if specified), the queue run limit (if specified), or the duration of the time window.

**-u user\_name** Creates a reservation for an individual user.

The -u *user\_name* option does not support the `@cluster` notation for advance reservations on remote clusters.

## Examples

- h** Prints command usage and exits.
- v** Prints LSF release version and exits.

## Examples

The following command creates a one-time advance reservation for 1024 processors on host `hostA` for user `user1` between 6:00 a.m. and 8:00 a.m. today:

```
brsvadd -n 1024 -m hostA -u user1 -b 6:0 -e 8:0  
Reservation "user1#0" is created
```

The hosts specified by `-m` can be local to the cluster or hosts leased from remote clusters.

The following command creates an advance reservation for 1024 processors on two hosts `hostA` and `hostB` for user group `groupA` every Wednesday from 12:00 midnight to 3:00 a.m.:

```
brsvadd -n 2048 -m "hostA hostB" -g groupA -t "3:0:0-3:3:0"  
Reservation "groupA#0" is created
```

The following command creates an open advance reservation for 1024 processors on host `hostA` for user `user1` between 6:00 a.m. and 8:00 a.m. today.

```
brsvadd -o -n 1024 -m hostA -u user1 -b 6:0 -e 8:0  
Reservation "user1#0" is created
```

## See Also

[brsvs](#), [brsvdel](#), [lsb.resources](#)

# brsvdel

deletes an advance reservation

## Synopsis

```
brsvdel reservation_ID ...
```

```
brsvdel [-h | -V]
```

## Description

---

**CAUTION:** By default, this command can only be used by LSF administrators or root.

---

Deletes advance reservations for the specified reservation IDs.

For example, if the following command was used to create the reservation `user1#0`,

```
brsvadd -n 1024 -m hostA -u user1 -b 13:0 -e 18:0  
Reservation "user1#0" is created
```

the following command deletes the reservation:

```
brsvdel user1#0  
Reservation user1#0 is being deleted
```

You can delete multiple reservations at a time.

To allow users to delete their own advance reservations without administrator intervention, configure advance reservation policies in the `ResourceReservation` section of `lsb.resources`.

Administrators and root can delete any reservations. Users listed in the `ResourceReservation` section can only delete reservations they created themselves.

## Options

- h** Prints command usage and exits.
- v** Prints LSF release version and exits.

## See Also

[brsvadd](#), [brsvs](#), `lsb.resources`

brsvs

# brsvs

displays advance reservations

## Synopsis

```
brsvs [-l] [-p all | "host_name ..."] [-w]
```

```
brsvs [-l] [-c all | "policy_name"] [-w]
```

```
brsvs [-h | -V]
```

## Description

By default, displays the current advance reservations for all hosts, users, and groups.

For advance reservations across clusters:

- ◆ `-p all` shows local and all remote reservations
- ◆ The default `all` includes both local and remote
- ◆ `host_name` does NOT take `host_name@cluster_name`

By default, `brsvs` truncates the reservation ID (RSVID) at 11 characters. Use `-w` to see the full reservation ID.

## Options

- l** Displays advance reservations in a long multiline format. In addition to the standard output, the `-l` option displays the reservation type (open or closed) and the job IDs of any jobs associated with the specified advance reservation, sorted by status.
- w** Wide format. Displays reservation information without truncating fields.

**-c all | "*policy\_name* ..."**

Shows advance reservation policies defined in `lsb.resources`. By default, displays all policy names.

The `all` keyword shows detailed information for all policies.

**-p all | "*host\_name* ..."**

Shows a weekly planner for specified hosts using advance reservations.

The `all` keyword shows a weekly planner for all hosts with reservations.

- h** Prints command usage and exits.
- V** Prints LSF release version and exits.

## Example

```
brsvs -c reservation1
Policy Name: reservation1
Users: ugroup1 ~user1
Hosts: hostA hostB
Time Window: 8:00-13:00
```

## See Also

[brsvadd](#), [brsvdel](#), [lsb.resources](#)

brun

# brun

forces a job to run immediately

## Synopsis

```
brun [-b] [-c] [-f] -m "host_name[#num_cpus] ... " job_ID
brun [-b] [-c] [-f] -m "host_name[#num_cpus] ... "
    "job_ID[index_list]"
brun [-h | -V]
```

## Description

---

**CAUTION:** This command can only be used by LSF administrators.

---

Forces a pending job to run immediately on specified hosts.

A job which has been forced to run is counted as a running job, this may violate the user, queue, or host job limits, and fairshare priorities. The forced job can run on hosts with an exclusive resource definition.

A job which has been forced to run cannot be preempted by other jobs even if it is submitted to a preemptable queue and other jobs are submitted to a preemptive queue.

By default, after the job is started, it is still subject to run windows and suspending conditions.

LSF administrators can use `brun` to force jobs with an advance reservation to run before the reservation is active, but the job must finish running before the time window of the reservation expires.

For example, if the administrator forces a job with a reservation to run one hour before the reservation is active, and the reservation period is 3 hours, a 4 hour run limit takes effect.

## OPTIONS

- b** Causes a checkpointable job to start over from the beginning, as if it had never been checkpointed.
- c** Distribute job slots for a multihost parallel job according to free CPUs.

By default, if a parallel job spans for more than one host, LSF distributes the slots based on the static CPU counts of each host listed in the `-m` option. Use `-c` to distribute the slots based on the free CPUs of each host instead of the static CPUs.

The `-c` option can be only applied to hosts whose total slot counts equal to their total CPU counts. `MXJ` in `lsb.hosts` must be less than or equal to the number of CPUs and `PJOB_LIMIT=1` must be specified in the queue (`lsb.queues`).

For example, a 6-CPU job is submitted to `hostA` and `hostB` with 4 CPUs each. Without `-c`, LSF would let the job take 4 slots from `hostA` first and then take 2 slots from `hostB` regardless to the status or the slots usage on `hostA` and `hostB`. If any

slots on `hostA` are used, the job will remain pending. With `-c`, LSF takes into consideration that `hostA` has 2 slots in use and `hostB` is completely free, so LSF is able to dispatch the job using the 2 free slots on `hostA` and all 4 slots on `hostB`.

- f** Allows the job to run without being suspended due to run windows or suspending conditions.

**-m "host\_name[#num\_cpus] ... "**

*Required.* Specify one or more hosts on which to run the job.

You can optionally specify the number of CPUs required per host for multihost parallel jobs. The `#num_cpus` option distributes job slots according the number of CPUs on the host. If `#num_cpus` is not defined, or if `#num_cpus` is greater than the number of static CPUs on the host (or the number of free CPUs if `-c` is specified), LSF distributes job slots according to the number of static CPUs on the host, or the number of free CPUs on the host if `-c` is specified. The number sign (`#`) is required as a prefix to the number of CPUs. The square brackets (`[ ]`) indicate that `#num_cpus` is optional. Do not include them in the command.

For example, the following command forces job 123 to run and specifies 1 CPU on `hostA` and 1 CPU on `hostB`:

```
brun -m "hostA#1 hostB#1" 123
```

**job\_ID | "job\_ID[index\_list]"**

*Required.* Specify the job to run, or specify one element of a job array.

- h** Prints command usage to `stderr` and exits.
- v** Prints LSF release version to `stderr` and exits.

## Limitations

You cannot force a job in `SSUSP` or `USUSP` state.

`brun` does not guarantee a job will run; it just forces LSF to dispatch the job.

In the MultiCluster job forwarding model, you can only force a job by running the command in the execution cluster.

bsla

# bsla

displays information about service class configuration for goal-oriented service-level agreement (SLA) scheduling

## Synopsis

```
bsla [service_class_name]
```

```
bsla [-h | -V]
```

## Description

`bsla` displays the properties of service classes configured in `lsb.serviceclasses` and dynamic information about the state of each configured service class.

If a default system service class is configured with `ENABLE_DEFAULT_EGO_SLA` in `lsb.params` but no other service classes are explicitly configured in `lsb.serviceclasses`, `bsla` only displays information for the default SLA.

## Options

***service\_class\_name*** The name of a service class configured in `lsb.serviceclasses`.

**-h** Prints command usage to `stderr` and exits.

**-V** Prints LSF release version to `stderr` and exits.

## Output

A list of job groups is displayed with the following fields:

### SERVICE CLASS NAME

The name of the service class, followed by its description, if any.

### PRIORITY

The service class priority. A higher value indicates a higher priority, relative to other service classes. Similar to queue priority, service classes access the cluster resources in priority order.

### CONSUMER

For EGO-enabled SLA service classes, the name of the EGO consumer from which hosts are allocated to the SLA.

### EGO\_RES\_REQ

For EGO-enabled SLA service classes, the EGO resource requirement defined in the SLA.

### MAX\_HOST\_IDLE\_TIME

For EGO-enabled SLA service classes, how long the SLA will hold its idle hosts before LSF releases them to EGO.

## NUM\_RECALLED\_HOSTS

For EGO-enabled SLA service classes, the number of hosts allocated to the SLA that EGO has reclaimed.

## RECALLED\_HOSTS\_TIMEOUT

For EGO-enabled SLA service classes, the amount of time EGO gives to LSF to clean up its workload before EGO reclaims the host.

## USER GROUP

User names or user groups who can submit jobs to the service class.

## GOAL

The type of service class goal and its configured value:

- ◆ THROUGHPUT
- ◆ VELOCITY
- ◆ DEADLINE

## ACTIVE WINDOW

The configured time window when the service class goal is active. If a throughput or velocity goal has no time window configured, ACTIVE WINDOW is Always Open.

## STATUS

Current status of the service class goal:

- ◆ Active:On time—the goal is active and meeting its target.
- ◆ Active:Delayed—the goal is active but is missing its target.
- ◆ Inactive—the goal is not active; its time window is closed. Jobs are scheduled as if no service class is defined. LSF does not enforce any service-level goal for an inactive SLA.

## THROUGHPUT

For throughput goals, the configured job throughput (finished jobs per hour) for the service class.

## SLA THROUGHPUT

The current throughput for the SLA finished jobs per clean period.

## ESTIMATED FINISH TIME

For goals with a time window, estimated finish time of the SLA. If the service class status is on time, the finish time will be before the configured deadline. If the service class status is delayed, the service class is missing its goal and `bsla` shows a finish time later than the deadline.

## OPTIMUM NUMBER OF RUNNING JOBS

For goals with a time window, the optimum number of jobs that should be running in the service class for the SLA to meet its goal.

Example

## NJOBS

The current number of job slots used by jobs in the specified service class. A parallel job is counted as 1 job, regardless of the number of job slots it will use.

## PEND

The number of pending job slots used by jobs in the specified service class.

## RUN

The number of job slots used by running jobs in the specified service class.

## SSUSP

The number of job slots used by the system-suspended jobs in the service class.

## USUSP

The number of job slots used by user-suspended jobs in the specified service class.

## FINISH

The number of jobs in the specified service class in EXITED or DONE state.

## Example

The following service class named `Kyuquot` is configured in `lsb.serviceclasses`:

```
Begin ServiceClass
NAME = Kyuquot
CONSUMER = Kyuquot
PRIORITY = 23
USER_GROUP = user1 user2
GOALS = [VELOCITY 8 timeWindow (9:00-17:30)] \
        [DEADLINE timeWindow (17:30-9:00)]
DESCRIPTION = Daytime/Nighttime SLA
End ServiceClass
```

`bsla` shows the following properties and current status:

```
bsla Kyuquot
SERVICE CLASS NAME: Kyuquot
-- Daytime/Nighttime SLA
PRIORITY: 23
CONSUMER: Kyuquot
EGO_RES_REQ: any host
MAX_HOST_IDLE_TIME: 120
USER_GROUP: user1 user2

GOAL: VELOCITY 8
ACTIVE WINDOW: (9:00-17:30)
STATUS: Active:On time
SLA THROUGHPUT: 0.00 JOBS/CLEAN_PERIOD

GOAL: DEADLINE
ACTIVE WINDOW: (17:30-9:00)
STATUS: Inactive
SLA THROUGHPUT: 0.00 JOBS/CLEAN_PERIOD
```

NJOBS	PEND	RUN	SSUSP	USUSP	FINISH
0	0	0	0	0	0

## See Also

[bsla\(1\)](#), [bhist\(1\)](#), [bjobs\(1\)](#), [bkill\(1\)](#), [bmod\(1\)](#), [bsub\(1\)](#), [lsb.acct\(5\)](#),  
[lsb.serviceclasses\(5\)](#)

# bslots

displays slots available and backfill windows available for backfill jobs

## Synopsis

```
bslots [-l] [-n slots] [-R "res_req"] [-W [hour:]minutes]
```

```
bslots [-h | -V]
```

## Description

The available slots displayed by `bslots` are not currently used for running jobs and can be used for backfill jobs. `bslots` displays a snapshot of the slots currently not in use by parallel jobs or advance reservations. They are not guaranteed to be available at job submission.

By default, displays all available slots, and the available run times (backfill windows) for those slots. When no slots are available for backfill, `bslots` displays

```
No backfill window exists at this time
```

`bslots` calculates the backfill window based on the estimated start time of potential backfill jobs. Estimated start time is only relatively accurate according to current running job information. If running jobs finish earlier or later, estimated start time may be moved to earlier or later time. There may be a small delay of a few minutes between the job finish time on which the estimate was based and the actual start time of the allocated job.

If the available backfill window has no run time limit, its length is displayed as UNLIMITED.

## Options

- l** Displays backfill windows in a long multi-line format. The `-l` option displays host names and the number of slots on each host available for backfill.
- n *slots*** Specifies required slots (processors). Backfill windows whose widths are equal or larger than specified value will be returned.  
When no slots are available for backfill, `bslots -n` displays  

```
No backfill window meets these requirements at this time
```
- R "*res\_req*"** Selects hosts for calculating the backfill windows according to the specified resource requirement. By default, selects hosts of any type. The `-R` option only supports the select resource requirement string. Other resource requirement section are not supported.  
When no slots are available for backfill, `bslots -R` displays  

```
No backfill window meets these requirements at this time
```
- W [*hour:*]*minutes*** Specifies expected runtime limit. Backfill windows whose lengths are equal or larger than specified value will be returned.  
When no slots are available for backfill, `bslots -W` displays  

```
No backfill window meets these requirements at this time
```

- h** Prints command usage to `stderr` and exits.
- v** Prints LSF release version to `stderr` and exits.

# bstatus

gets current external job status or sets new job status

## Synopsis

```
bstatus [-d "description"] job_ID | "job_ID[index]" | -J job_name
bstatus [-h | -V]
```

## Description

Gets and displays the message description text of a job, or changes the contents of the message description text with the `-d` option. Always operates on the message with index 0.

You can set the external status of a job until it completes. You cannot change the status of done or exited jobs. You can display the status of a job until it is cleaned from the system.

If a you specify a job ID:

- ◆ You can get the external job status of jobs submitted by other users, but you cannot set job status of jobs submitted by other users.
- ◆ You can only set external status on your own jobs.
- ◆ Only root and LSF administrators can set external job status on jobs submitted by other users.

Job names are not unique; if you specify `-J job_name`:

- ◆ You can only get or set the external status on your own jobs.
- ◆ You cannot get or set external job status on jobs submitted by other users.
- ◆ Root and the LSF administrators can only get or set the external status on their own jobs.

## Options

**-d "*description*"** Updates the job status with specified message description text.

***job\_ID* | "*job\_ID[index]*" | -J *job\_name***

Required. Operates on the specified job.

**-h** Prints command usage to `stderr` and exits.

**-V** Prints LSF release version to `stderr` and exits.

## Examples

```
bstatus 2500
JOBID    FROM      UPDATE_TIME  STATUS
2500     user1     Sep 14 16:54  step 1
```

Displays the message description text of message index 0 of job 2500.

```
bstatus -d "step 2" 2500
```

Changes the message description text of message index 0 of job 2500 to `step 2`.

## See Also

[bpost\(1\)](#), [bread\(1\)](#)

bstop

# bstop

suspends unfinished jobs

## Synopsis

```
bstop [-a] [-d] [-app application_profile_name] [-g job_group_name]
      [-sla service_class_name] [-J job_name] [-m host_name | -m
      host_group] [-q queue_name] [-u user_name |
      -u user_group | -u all] [0] [job_ID ... | "job_ID[index]"] ...
bstop [-h | -V]
```

## Description

Suspends unfinished jobs.

Sends the SIGSTOP signal to sequential jobs and the SIGTSTP signal to parallel jobs to suspend them.

You must specify a job ID or -g, -J, -m, -u, or -q. You cannot suspend a job that is already suspended. Specify job ID 0 (zero) to stop multiple jobs.

Only root and LSF administrators can operate on jobs submitted by other users.

Use `bresume` to resume suspended jobs.

Using `bstop` on a job that is in the USUSP state has no effect.

You can also use `bkill -s STOP` to send the suspend signal to a job or use `bkill -s TSTP` to suspend one or more parallel jobs. Use `bkill -s CONT` to send a resume signal to a job.

If a signal request fails to reach the job execution host, LSF will retry the operation later when the host becomes reachable. LSF retries the most recent signal request.

## Options

- 0** Suspends all the jobs that satisfy other options (-g, -m, -q, -u, and -J).
- a** Suspends all jobs.

### **-app *application\_profile\_name***

Suspends only jobs associated with the specified application profile. You must specify an existing application profile.

**-g *job\_group\_name*** Suspends only jobs in the specified job group.

**-J *job\_name*** Suspends only jobs with the specified name.

### **-m *host\_name* | -m *host\_group***

Suspends only jobs dispatched to the specified host or host group.

**-q *queue\_name*** Suspends only jobs in the specified queue.

### **-sla *service\_class\_name***

Suspends jobs belonging to the specified service class.

Use `bsla` to display the properties of service classes configured in `LSB_CONFDIR/cluster_name/configdir/lsb.serviceclasses` (see `lsb.serviceclasses(5)`) and dynamic information about the state of each configured service class.

**-u *user\_name* | -u *user\_group* | -u all**

Suspends only jobs owned by the specified user or user group, or all users if the keyword `all` is specified. To specify a Windows user account, include the domain name in uppercase letters and use a single backslash (`DOMAIN_NAME\user_name`) in a Windows command line or a double backslash (`DOMAIN_NAME\\user_name`) in a UNIX command line.

***job\_ID* ... | "*job\_ID[index]*" ...**

Suspends only the specified jobs. Jobs submitted by any user can be specified here without using the `-u` option.

- h** Prints command usage to `stderr` and exits.
- v** Prints LSF release version to `stderr` and exits.

## Examples

```
bstop 314
```

Suspends job number 314.

```
bstop -m hostA
```

Suspends the invoker's last job that was dispatched to host `hostA`.

```
bstop -u jsmith 0
```

Suspends all the jobs submitted by user `jsmith`.

```
bstop -u all
```

Suspends the last submitted job in the LSF system.

```
bstop -u all 0
```

Suspends all jobs for all users in the LSF system.

```
bstop -g /risk_group/consolidate 0
```

Suspends all jobs in the job group `/risk_group/consolidate`.

```
bstop -app fluent 0
```

Suspends all jobs associated with the application profile `fluent`.

## See Also

[bsub\(1\)](#), [bjobs\(1\)](#), [bqueues\(1\)](#), [bhosts\(1\)](#), [bresume\(1\)](#), [bkill\(1\)](#), [bapp\(1\)](#), [bgadd\(1\)](#), [bgdel\(1\)](#), [bjgroup\(1\)](#), [bparams\(5\)](#), [mbatchd\(8\)](#), [kill\(1\)](#), [signal\(2\)](#) [lsb.params\(5\)](#)

# bsub

submits a batch job to LSF

## Synopsis

```
bsub [options] command [arguments]
```

```
bsub [-h | -V]
```

## Option List

```
-B
-H
-I | -Ip | -Is
-K
-N
-r | -rn
-ul
-x
-a esub_application
-app application_profile_name
-b [[month:]day:]hour:minute
-C core_limit
-c [hour:]minute[/host_name | /host_model]
-cwd "current_working_directory"
-D data_limit
-E "pre_exec_command [arguments ...]"
-Ep "post_exec_command [arguments ...]"
-e error_file
-eo error_file
-ext[sched] "external_scheduler_options"
-F file_limit
-f "local_file operator [remote_file]" ...
-G user_group
-g job_group_name
-i input_file | -is input_file
-J job_name | -J "job_name[index_list]%job_slot_limit"
-jSDL file_name | -jSDL_strict file_name
-k "checkpoint_dir [checkpoint_period] [method=method_name]"
-L login_shell
-Lp ls_project_name
```

```

-M mem_limit
-m "host_name[@cluster_name][[!] | +[pref_level]] | host_group[[!] | +[pref_level]]
..."
-n min_proc[, max_proc]
-o output_file
-oo output_file
-P project_name
-p process_limit
-q "queue_name ..."
-R "res_req" [-R "res_req" ...]
-S stack_limit
-s signal
-sla service_class_name
-sp priority
-T thread_limit
-t [[month:]day:]hour:minute
-U reservation_ID
-u mail_user
-v swap_limit
-W [hour:]minute[/host_name | /host_model]
-We [hour:]minute[/host_name | /host_model]
-w 'dependency_expression'
-wa '[signal | command | CHKPNT]'
-wt '[hour:]minute'
-Zs
-h
-V

```

## Description

Submits a job for batch execution and assigns it a unique numerical job ID.

Runs the job on a host that satisfies all requirements of the job, when all conditions on the job, host, queue, application profile, and cluster are satisfied. If LSF cannot run all jobs immediately, LSF scheduling policies determine the order of dispatch. Jobs are started and suspended according to the current system load.

Sets the user's execution environment for the job, including the current working directory, file creation mask, and all environment variables, and sets LSF environment variables before starting the job.

When a job is run, the command line and `stdout/stderr` buffers are stored in the directory `home_directory/.lsbatch` on the execution host. If this directory is not accessible, `/tmp/.lsbtmp user_ID` is used as the job's home directory. If the current

## Description

working directory is under the home directory on the submission host, then the current working directory is also set to be the same relative directory under the home directory on the execution host.

By default, if the current working directory is not accessible on the execution host, the job will run in `/tmp`. If the environment variable

`LSB_EXIT_IF_CWD_NOTEXIST` is set to `Y` and the current working directory is not accessible on the execution host, the job exits with the exit code 2.

If no command is supplied, `bsub` prompts for the command from the standard input. On UNIX, the input is terminated by entering `CTRL-D` on a new line. On Windows, the input is terminated by entering `CTRL-Z` on a new line.

To kill a batch job submitted with `bsub`, use `bkill`.

Use `bmod` to modify jobs submitted with `bsub`. `bmod` takes similar options to `bsub`.

Jobs submitted to a chunk job queue with the following options are not chunked; they are dispatched individually:

- ◆ `-I` (interactive jobs)
- ◆ `-c` (jobs with CPU limit greater than 30)
- ◆ `-W` (jobs with run limit greater than 30 minutes)

To submit jobs from UNIX to display GUIs through Microsoft Terminal Services on Windows, submit the job with `bsub` and define the environment variables `LSF_LOGON_DESKTOP=1` and `LSB_TSJOB=1` on the UNIX host. Use `tssub` to submit a Terminal Services job from Windows hosts. See *Using Platform LSF on Windows* for more details.

If the parameter `LSB_STDOUT_DIRECT` in `lsf.conf` is set to `Y` or `y`, and you use the `-o` or `-oo` option, the standard output of a job is written to the file you specify as the job runs. If `LSB_STDOUT_DIRECT` is not set, and you use `-o` or `-oo`, the standard output of a job is written to a temporary file and copied to the specified file after the job finishes. `LSB_STDOUT_DIRECT` is not supported on Windows.

## Default Behavior

LSF assumes that uniform user names and user ID spaces exist among all the hosts in the cluster. That is, a job submitted by a given user will run under the same user's account on the execution host. For situations where nonuniform user names and user ID spaces exist, account mapping must be used to determine the account used to run a job.

`bsub` uses the command name as the job name. Quotation marks are significant.

Options related to file names and job spooling directories support paths that contain up to 4094 characters for UNIX and Linux, or up to 255 characters for Windows.

Options related to command names and job names names can contain up to 4094 characters for UNIX and Linux, or up to 255 characters for Windows.

Options for the following resource usage limits are specified in KB:

- ◆ Core limit (`-C`)
- ◆ Memory limit (`-M`)
- ◆ Stack limit (`-S`)

◆ Swap limit (-v)

Use `LSF_UNIT_FOR_LIMITS` in `lsf.conf` to specify a larger unit for the the limit (MB, GB, TB, PB, or EB).

If fairshare is defined and you belong to multiple user groups, the job will be scheduled under the user group that allows the quickest dispatch.

The job is not checkpointable.

`bsub` automatically selects an appropriate queue. If you defined a default queue list by setting `LSB_DEFAULTQUEUE` environment variable, the queue is selected from your list. If `LSB_DEFAULTQUEUE` is not defined, the queue is selected from the system default queue list specified by the LSF administrator with the `DEFAULT_QUEUE` parameter in `lsb.params`.

LSF tries to obtain resource requirement information for the job from the remote task list that is maintained by the load sharing library (see `lsfintr(1)`). If the job is not listed in the remote task list, the default resource requirement is to run the job on a host or hosts that are of the same host type (see `lshosts(1)`) as the submission host.

`bsub` assumes only one processor is requested.

`bsub` does not start a login shell but runs the job file under the execution environment from which the job was submitted.

The input file for the batch job is `/dev/null` (no input).

`bsub` sends mail to you when the job is done. The default destination is defined by `LSB_MAILTO` in `lsf.conf`. The mail message includes the job report, the job output (if any), and the error message (if any).

`bsub` charges the job to the default project. The default project is the project you define by setting the environment variable `LSB_DEFAULTPROJECT`. If you do not set `LSB_DEFAULTPROJECT`, the default project is the project specified by the LSF administrator with `DEFAULT_PROJECT` parameter in `lsb.params`. If `DEFAULT_PROJECT` is not defined, then LSF uses `default` as the default project name.

## Options

- B** Sends mail to you when the job is dispatched and begins execution.
- H** Holds the job in the PSUSP state when the job is submitted. The job will not be scheduled until you tell the system to resume the job (see `bresume(1)`).
- I | -Ip | -Is** Submits a batch interactive job. A new job cannot be submitted until the interactive job is completed or terminated.
  - Sends the job's standard output (or standard error) to the terminal. Does not send mail to you when the job is done unless you specify the `-N` option.
  - Terminal support is available for a batch interactive job.
  - When you specify the `-Ip` option, submits a batch interactive job and creates a pseudo-terminal when the job starts. Some applications (for example, `vi`) require a pseudo-terminal in order to run correctly.

When you specify the `-Is` option, submits a batch interactive job and creates a pseudo-terminal with shell mode support when the job starts. This option should be specified for submitting interactive shells, or applications which redefine the CTRL-C and CTRL-Z keys (for example, `jove`).

If the `-i input_file` option is specified, you cannot interact with the job's standard input via the terminal.

If the `-o out_file` option is specified, sends the job's standard output to the specified output file. If the `-e err_file` option is specified, sends the job's standard error to the specified error file.

You cannot use `-I`, `-Ip`, or `-Is` with the `-K` option.

Interactive jobs cannot be checkpointed.

Interactive jobs cannot be rerunnable (`bsub -r`).

The options that create a pseudo-terminal (`-Ip` and `-Is`) are not supported on Windows.

- K** Submits a batch job and waits for the job to complete. Sends the message "Waiting for dispatch" to the terminal when you submit the job. Sends the message "Job is finished" to the terminal when the job is done.

You will not be able to submit another job until the job is completed. This is useful when completion of the job is required in order to proceed, such as a job script. If the job needs to be rerun due to transient failures, `bsub` returns after the job finishes successfully. `bsub` will exit with the same exit code as the job so that job scripts can take appropriate actions based on the exit codes. `bsub` exits with value 126 if the job was terminated while pending.

You cannot use the `-K` option with the `-I`, `-Ip`, or `-Is` options.

- N** Sends the job report to you by mail when the job finishes. When used without any other options, behaves the same as the default.

Use only with `-o`, `-oo`, `-I`, `-Ip`, and `-Is` options, which do not send mail, to force LSF to send you a mail message when the job is done.

- r | -rn** If the execution host becomes unavailable while a job is running, specifies that the job will rerun on another host. LSF requeues the job in the same job queue with the same job ID. When an available execution host is found, reruns the job as if it were submitted new, even if the job has been checkpointed. You receive a mail message informing you of the host failure and requeuing of the job.

If the system goes down while a job is running, specifies that the job will be requeued when the system restarts.

Reruns a job if the execution host or the system fails; it does not rerun a job if the job itself fails.

`-rn` specifies that the job is never rerunnable. `bsub -rn` disables job rerun if the job was submitted to a rerunnable queue or application profile with job rerun configured. The command level job rerunnable setting overrides the application profile and and queue level setting. `bsub -rn` is different from `bmod -rn`, which *cannot* override the application profile and queue level rerunnable job setting.

Members of a chunk job can be rerunnable. If the execution host becomes unavailable, rerunnable chunk job members are removed from the queue and dispatched to a different execution host.

Interactive jobs (`bsub -I`) cannot be rerunnable.

- ul** Passes the current operating system user shell limits for the job submission user to the execution host. User limits cannot override queue hard limits. If user limits exceed queue hard limits, the job will be rejected.

---

**RESTRICTION:** UNIX and Linux only. `-ul` is not supported on Windows.

---

The following `bsub` options for job-level runtime limits override the value of the user shell limits:

- ◆ Per-process (soft) core file size limit (`-C`)
- ◆ CPU limit (`-c`)
- ◆ Per-process (soft) data segment size limit (`-D`)
- ◆ File limit (`-F`)
- ◆ Per-process (soft) memory limit (`-M`)
- ◆ Process limit (`-p`)
- ◆ Per-process (soft) stack segment size limit (`-S`)
- ◆ Limit of the number of concurrent threads (`-T`)
- ◆ Total process virtual memory (swap space) limit (`-v`)
- ◆ Runtime limit (`-W`)

LSF collects the user limit settings from the user's running environment that are supported by the operating system, and sets the value to submission options if the value is no unlimited. If the operating system has other kinds of shell limits, LSF will not collect them. LSF collects the following operating system user limits:

- ◆ CPU time in milliseconds
- ◆ Maximum file size
- ◆ Data size
- ◆ Stack size
- ◆ Core file size
- ◆ Resident set size
- ◆ Open files
- ◆ Virtual (swap) memory
- ◆ Process limit
- ◆ Thread limit

- x** Puts the host running your job into exclusive execution mode.

In exclusive execution mode, your job runs by itself on a host. It is dispatched only to a host with no other jobs running, and LSF does not send any other jobs to the host until the job completes.

To submit a job in exclusive execution mode, the queue must be configured to allow exclusive jobs.

When the job is dispatched, `bhosts(1)` reports the host status as `closed_Excl`, and `lsload(1)` reports the host status as `lockU`.

Until your job is complete, the host is not selected by LIM in response to placement requests made by `lsplace(1)`, `lsrun(1)` or `lsgrun(1)` or any other load sharing applications.

You can force other batch jobs to run on the host by using the `-m host_name` option of `brun(1)` to explicitly specify the locked host.

You can force LIM to run other interactive jobs on the host by using the `-m host_name` option of `lsrun(1)` or `lsgrun(1)` to explicitly specify the locked host.

**-a *esub\_application*** Specifies one or more application-specific `esub` executables that you want LSF to associate with the job.

The value of `-a` must correspond to the application name of an actual `esub` file. For example, to use `bsub -a fluent`, the file `esub.fluent` must exist in `LSF_SERVERDIR`.

For example, to submit a job that invokes two application-specific `esub` executables named `esub.license` and `esub.fluent`, enter:

```
bsub -a license fluent my_job
```

`mesub` uses the method name `license` to invoke the `esub` named `LSF_SERVERDIR/esub.license`, and the method name `fluent` to invoke the `esub` named `LSF_SERVERDIR/esub.fluent`.

The name of an application-specific `esub` program is passed to the master `esub`. The master `esub` program (`LSF_SERVERDIR/mesub`) handles job submission requirements of the application. Application-specific `esub` programs can specify their own job submission requirements. The value of `-a` is set in the `LSB_SUB_ADDITIONAL` option in the `LSB_SUB_PARM` file used by `esub`.

If an LSF administrator specifies one or more mandatory `esub` executables using the parameter `LSB_ESUB_METHOD`, LSF invokes the mandatory executables first, followed by the executable named `esub` (without `.esub_application` in the file name) if it exists in `LSF_SERVERDIR`, and then any application-specific `esub` executables (with `.esub_application` in the file name) specified by `-a.esub_application`.

The name of the `esub` program must be a valid file name. It can contain only alphanumeric characters, underscore (`_`) and hyphen (`-`).

---

**RESTRICTION:** After LSF version 5.1, the value of `-a` and `LSB_ESUB_METHOD` must correspond to an actual `esub` file in `LSF_SERVERDIR`. For example, to use `bsub -a fluent`, the file `esub.fluent` must exist in `LSF_SERVERDIR`.

---

**-app *application\_profile\_name***

Submits the job to the specified application profile. You must specify an existing application profile. If the application profile does not exist in `lsb.applications`, the job is rejected.

**-b *[[month:]day:]hour:minute***

Dispatches the job for execution on or after the specified date and time. The date and time are in the form of `[[month:]day:]hour:minute` where the number ranges are as follows: month 1-12, day 1-31, hour 0-23, minute 0-59.

At least two fields must be specified. These fields are assumed to be hour:minute. If three fields are given, they are assumed to be day:hour:minute, and four fields are assumed to be *month:day:hour:minute*.

**-C *core\_limit*** Sets a per-process (soft) core file size limit for all the processes that belong to this batch job (see `getrlimit(2)`).

By default, the limit is specified in KB. Use `LSF_UNIT_FOR_LIMITS` in `lsf.conf` to specify a larger unit for the the limit (MB, GB, TB, PB, or EB).

The behavior of this option depends on platform-specific UNIX or Linux systems.

In some cases, the process is sent a `SIGXFSZ` signal if the job attempts to create a core file larger than the specified limit. The `SIGXFSZ` signal normally terminates the process.

In other cases, the writing of the core file terminates at the specified limit.

**-c *[hour:]minute[/host\_name | /host\_model]***

Limits the total CPU time the job can use. This option is useful for preventing runaway jobs or jobs that use up too many resources. When the total CPU time for the whole job has reached the limit, a `SIGXCPU` signal is first sent to the job, then `SIGINT`, `SIGTERM`, and `SIGKILL`.

If `LSB_JOB_CPULIMIT` in `lsf.conf` is set to `n`, LSF-enforced CPU limit is disabled and LSF passes the limit to the operating system. When one process in the job exceeds the CPU limit, the limit is enforced by the operating system.

The CPU limit is in the form of `[hour:]minute`. The minutes can be specified as a number greater than 59. For example, three and a half hours can either be specified as `3:30`, or `210`.

The CPU time you specify is the *normalized* CPU time. This is done so that the job does approximately the same amount of processing for a given CPU limit, even if it is sent to host with a faster or slower CPU. Whenever a normalized CPU time is given, the actual time on the execution host is the specified time multiplied by the CPU factor of the normalization host then divided by the CPU factor of the execution host.

Optionally, you can supply a host name or a host model name defined in LSF. You must insert a slash (/) between the CPU limit and the host name or model name. (See `lsinfo(1)` to get host model information.) If a host name or model name is not given, LSF uses the default CPU time normalization host defined at the queue level (`DEFAULT_HOST_SPEC` in `lsb.queues`) if it has been configured, otherwise uses the default CPU time normalization host defined at the cluster level (`DEFAULT_HOST_SPEC` in `lsb.params`) if it has been configured, otherwise uses the submission host.

Jobs submitted to a chunk job queue are not chunked if the CPU limit is greater than 30 minutes.

**-cwd "*current\_working\_directory*"**

Specifies the current working directory for the job.

By default, if the current working directory is not accessible on the execution host, the job will run in `/tmp`. If the environment variable `LSB_EXIT_IF_CWD_NOTEXIST` is set to `Y` and the current working directory is not accessible on the execution host, the job exits with the exit code 2.

**-D `data_limit`** Sets a per-process (soft) data segment size limit for each of the processes that belong to the batch job (see `getrlimit(2)`). The limit is specified in KB.

This option affects calls to `sbrk()` and `brk()`. An `sbrk()` or `malloc()` call to extend the data segment beyond the data limit returns an error.

---

**NOTE:** Linux does not use `sbrk()` and `brk()` within its `calloc()` and `malloc()`. Instead, it uses `mmap()` to create memory. `DATALIMIT` cannot be enforced on Linux applications that call `sbrk()` and `malloc()`.

---

**-E "`pre_exec_command [arguments ...]`"**

Runs the specified pre-execution command on the execution host before actually running the job. For a parallel job, the pre-execution command runs on the first host selected for the parallel job. If you want the pre-execution command to run on a specific first execution host, specify one or more first execution host candidates at the job level using `-m`, at the queue level with `PRE_EXEC` in `lsb.queues`, or at the application level with `PRE_EXEC` in `lsb.applications`.

If the pre-execution command returns a zero (0) exit code, LSF runs the job on the selected host. Otherwise, the job and its associated pre-execution command goes back to `PEND` status and is rescheduled. LSF keeps trying to run pre-execution commands and pending jobs. After the pre-execution command runs successfully, LSF runs the job. You must ensure that the pre-execution command can run multiple times without causing side effects, such as reserving the same resource more than once.

The standard input and output for the pre-execution command are directed to the same files as the job. The pre-execution command runs under the same user ID, environment, home, and working directory as the job. If the pre-execution command is not in the user's usual execution path (the `$PATH` variable), the full path name of the command must be specified.

**-Ep "`post_exec_command [arguments ...]`"**

Runs the specified post-execution command on the execution host after the job finishes.

If both application-level (`POST_EXEC` in `lsb.applications`) and job-level post-execution commands are specified, job level post-execution overrides application-level post-execution commands. Queue-level post-execution commands (`POST_EXEC` in `lsb.queues`) run after application-level post-execution and job-level post-execution commands.

**-e `error_file`** Specify a file path. Appends the standard error output of the job to the specified file.

If the parameter `LSB_STDOUT_DIRECT` in `lsf.conf` is set to `Y` or `y`, the standard error output of a job is written to the file you specify as the job runs. If `LSB_STDOUT_DIRECT` is not set, it is written to a temporary file and copied to the specified file after the job finishes. `LSB_STDOUT_DIRECT` is not supported on Windows.

If you use the special character %J in the name of the error file, then %J is replaced by the job ID of the job. If you use the special character %I in the name of the error file, then %I is replaced by the index of the job in the if the job is a member of an array. Otherwise, %I is replaced by 0 (zero).

If the current working directory is not accessible on the execution host after the job starts, LSF writes the standard error output file to /tmp/.

---

**NOTE:** The file path can contain up to 4094 characters for UNIX and Linux, or up to 255 characters for Windows, including the directory, file name, and expanded values for %J (*job\_ID*) and %I (*index\_ID*).

---

**-eo *error\_file*** Specify a file path. Overwrites the standard error output of the job to the specified file.

If the parameter `LSB_STDOUT_DIRECT` in `lsf.conf` is set to `Y` or `y`, the standard error output of a job is written to the file you specify as the job runs, which will occur every time the job is submitted with the overwrite option, even if it is requeued manually or by the system. If `LSB_STDOUT_DIRECT` is not set, it is written to a temporary file and copied to the specified file after the job finishes. `LSB_STDOUT_DIRECT` is not supported on Windows.

If you use the special character %J in the name of the error file, then %J is replaced by the job ID of the job. If you use the special character %I in the name of the error file, then %I is replaced by the index of the job in the array if the job is a member of an array. Otherwise, %I is replaced by 0 (zero).

If the current working directory is not accessible on the execution host after the job starts, LSF writes the standard error output file to /tmp/.

---

**NOTE:** The file path can contain up to 4094 characters for UNIX and Linux, or up to 255 characters for Windows, including the directory, file name, and expanded values for %J (*job\_ID*) and %I (*index\_ID*).

---

### **-ext[sched] "*external\_scheduler\_options*"**

Application-specific external scheduling options for the job.

To enable jobs to accept external scheduler options, set `LSF_ENABLE_EXTSCHEDULER=y` in `lsf.conf`.

You can abbreviate the `-extsched` option to `-ext`.

You can specify only one type of external scheduler option in a single `-extsched` string.

For example, SGI IRIX hosts and AlphaServer SC hosts running RMS can exist in the same cluster, but they accept different external scheduler options. Use external scheduler options to define job requirements for either IRIX cpusets OR RMS, but *not* both. Your job will run either on IRIX or RMS. If external scheduler options are not defined, the job may run on IRIX but it will not run on an RMS host.

The options set by `-extsched` can be combined with the queue-level `MANDATORY_EXTSCHED` or `DEFAULT_EXTSCHED` parameters. If `-extsched` and `MANDATORY_EXTSCHED` set the same option, the `MANDATORY_EXTSCHED` setting is used. If `-extsched` and `DEFAULT_EXTSCHED` set the same options, the `-extsched` setting is used.

## Options

Use `DEFAULT_EXTSCHEM` in `lsb.queues` to set default external scheduler options for a queue.

To make certain external scheduler options mandatory for all jobs submitted to a queue, specify `MANDATORY_EXTSCHEM` in `lsb.queues` with the external scheduler options you need or your jobs.

See *Using Platform LSF HPC* for information about specific external scheduler options.

**-F `file_limit`** Sets a per-process (soft) file size limit for each of the processes that belong to the batch job (see `getrlimit(2)`). The limit is specified in KB.

If a job process attempts to write to a file that exceeds the file size limit, then that process is sent a `SIGXFSZ` signal. The `SIGXFSZ` signal normally terminates the process.

**-f "`local_file operator [remote_file]`" ...**

Copies a file between the local (submission) host and the remote (execution) host. Specify absolute or relative paths, including the file names. You should specify the remote file as a file name with no path when running in non-shared systems.

If the remote file is not specified, it defaults to the local file, which must be given. Use multiple `-f` options to specify multiple files.

### ***operator***

An operator that specifies whether the file is copied to the remote host, or whether it is copied back from the remote host. The operator must be surrounded by white space.

The following describes the operators:

> Copies the local file to the remote file before the job starts. Overwrites the remote file if it exists.

< Copies the remote file to the local file after the job completes. Overwrites the local file if it exists.

<< Appends the remote file to the local file after the job completes. The local file must exist.

>< Copies the local file to the remote file before the job starts. Overwrites the remote file if it exists. Then copies the remote file to the local file after the job completes. Overwrites the local file.

<> Copies the local file to the remote file before the job starts. Overwrites the remote file if it exists. Then copies the remote file to the local file after the job completes. Overwrites the local file.

If you use the `-i input_file` option, then you do not have to use the `-f` option to copy the specified input file to the execution host. LSF does this for you, and removes the input file from the execution host after the job completes.

If you use the `-o out_file`, `-e err_file`, `-oo out_file`, or the `-eo err_file` option, and you want the specified file to be copied back to the submission host when the job completes, then you must use the `-f` option.

If the submission and execution hosts have different directory structures, you must make sure that the directory where the remote file and local file will be placed exists.

If the local and remote hosts have different file name spaces, you must always specify relative path names. If the local and remote hosts do not share the same file system, you must make sure that the directory containing the remote file exists. It is recommended that only the file name be given for the remote file when running in heterogeneous file systems. This places the file in the job's current working directory. If the file is shared between the submission and execution hosts, then no file copy is performed.

LSF uses `lsrncp` to transfer files (see `lsrncp(1)` command). `lsrncp` contacts RES on the remote host to perform the file transfer. If RES is not available, `ncp` is used (see `ncp(1)`). The user must make sure that the `ncp` binary is in the user's `$PATH` on the execution host.

Jobs that are submitted from LSF client hosts should specify the `-f` option only if `ncp` is allowed. Similarly, `ncp` must be allowed if account mapping is used.

**-G *user\_group*** Only useful with fairshare scheduling.

Associates the job with the specified group. Specify any group that you belong to that does not contain any subgroups. You must be a direct member of the specified user group.

**-g *job\_group\_name*** Submits jobs in the job group specified by *job\_group\_name*. The job group does not have to exist before submitting the job. For example:

```
bsub -g /risk_group/portfolio1/current myjob
Job <105> is submitted to default queue.
```

Submits `myjob` to the job group `/risk_group/portfolio1/current`.

If group `/risk_group/portfolio1/current` exists, job 105 is attached to the job group.

Job group names can be up to 512 characters long.

If group `/risk_group/portfolio1/current` does not exist, LSF checks its parent recursively, and if no groups in the hierarchy exist, all three job groups are created with the specified hierarchy and the job is attached to group.

You can use `-g` with `-sla`. All jobs in a job group attached to a service class are scheduled as SLA jobs. It is not possible to have some jobs in a job group not part of the service class. Multiple job groups can be created under the same SLA. You can submit additional jobs to the job group without specifying the service class name again.

For example, the following attaches the job to the service class named `opera`, and the group `/risk_group/portfolio1/current`:

```
bsub -sla opera -g /risk_group/portfolio1/current myjob
```

To submit another job to the same job group, you can omit the SLA name:

```
bsub -g /risk_group/portfolio1/current myjob2
```

**-i *input\_file* | -is *input\_file***

Gets the standard input for the job from specified file. Specify an absolute or relative path. The input file can be any type of file, though it is typically a shell script text file.

Unless you use `-is`, you can use the special characters `%J` and `%I` in the name of the input file. `%J` is replaced by the job ID. `%I` is replaced by the index of the job in the array, if the job is a member of an array, otherwise by 0 (zero). The special characters `%J` and `%I` are not valid with the `-is` option.

---

**NOTE:** The file path can contain up to 4094 characters for UNIX and Linux, or up to 255 characters for Windows, including the directory, file name, and expanded values for `%J` (*job\_ID*) and `%I` (*index\_ID*).

---

If the file exists on the execution host, LSF uses it. Otherwise, LSF attempts to copy the file from the submission host to the execution host. For the file copy to be successful, you must allow remote copy (`rcp`) access, or you must submit the job from a server host where RES is running. The file is copied from the submission host to a temporary file in the directory specified by the `JOB_SPOOL_DIR` parameter in `lsb.params`, or your `$HOME/.lsbatch` directory on the execution host. LSF removes this file when the job completes.

By default, the input file is spooled to `LSB_SHAREDIR/cluster_name/lsf_indir`. If the `lsf_indir` directory does not exist, LSF creates it before spooling the file. LSF removes the spooled file when the job completes. Use the `-is` option if you need to modify or remove the input file before the job completes. Removing or modifying the original input file does not affect the submitted job.

If `JOB_SPOOL_DIR` is specified, the `-is` option spools the input file to the specified directory and uses the spooled file as the input file for the job.

`JOB_SPOOL_DIR` can be any valid path up to a maximum length up to 4094 characters on UNIX and Linux or up to 255 characters for Windows.

`JOB_SPOOL_DIR` must be readable and writable by the job submission user, and it must be shared by the master host and the submission host. If the specified directory is not accessible or does not exist, `bsub -is` cannot write to the default directory `LSB_SHAREDIR/cluster_name/lsf_indir` and the job will fail.

### **`-J job_name | -J "job_name[index_list]%job_slot_limit"`**

Assigns the specified name to the job, and, for job arrays, specifies the indices of the job array and optionally the maximum number of jobs that can run at any given time.

The job name does not need to be unique.

Job names can contain up to 4094 characters for UNIX and Linux, or up to 255 characters for Windows.

To specify a job array, enclose the index list in square brackets, as shown, and enclose the entire job array specification in quotation marks, as shown. The index list is a comma-separated list whose elements have the syntax `start[-end[:step]]` where `start`, `end` and `step` are positive integers. If the `step` is omitted, a step of one is assumed. The job array index starts at one.

By default, the maximum number of jobs in a job array is 1000, which means the maximum size of a job array (that is, the maximum job array index) can never exceed 1000 jobs.

To change the maximum job array value, set `MAX_JOB_ARRAY_SIZE` in `lsb.params` to any positive integer between 1 and 2147483646. The maximum number of jobs in a job array cannot exceed the value set by `MAX_JOB_ARRAY_SIZE`.

You may also use a positive integer to specify the system-wide job slot limit (the maximum number of jobs that can run at any given time) for this job array.

All jobs in the array share the same job ID and parameters. Each element of the array is distinguished by its array index.

After a job is submitted, you use the job name to identify the job. Specify `"job_ID[index]"` to work with elements of a particular array. Specify `"job_name[index]"` to work with elements of all arrays with the same name. Since job names are not unique, multiple job arrays may have the same name with a different or same set of indices.

### **-jsdl file\_name | -jsdl\_strict file\_name**

Submits a job using a JSDL file to specify job submission options.

LSF provides an extension to the JSDL specification so that you can submit jobs using LSF features not defined in the JSDL standard schema. The JSDL schema (`jsdl.xsd`), the POSIX extension (`jsdl-posix.xsd`), and the LSF extension (`jsdl-lsf.xsd`) are located in the `LSF_LIBDIR` directory.

- ◆ To submit a job that uses the LSF extension, use the `-jsdl` option.
- ◆ To submit a job that uses only standard JSDL elements and POSIX extensions, use the `-jsdl_strict` option. You can use the `-jsdl_strict` option to verify that your file contains only valid JSDL elements and POSIX extensions. Error messages indicate invalid elements, including:
  - ❖ Elements that are not part of the JSDL specification
  - ❖ Valid JSDL elements that are not supported in this version of LSF
  - ❖ Extension elements that are not part of the JSDL standard and POSIX extension schemas

---

**NOTE:** For a detailed mapping of JSDL elements to LSF submission options, and for a complete list of supported and unsupported elements, see the chapter "Submitting Jobs Using JSDL" in *Administering Platform LSF*.

---

If you specify duplicate or conflicting job submission parameters, LSF resolves the conflict by applying the following rules:

- 1 The parameters specified in the command line override all other parameters.
- 2 A job script or user input for an interactive job overrides parameters specified in the JSDL file.

### **-k "checkpoint\_dir [checkpoint\_period][method=method\_name]"**

Makes a job checkpointable and specifies the checkpoint directory. If you omit the checkpoint period, the quotes are not required. Specify a relative or absolute path name.

When a job is checkpointed, the checkpoint information is stored in `checkpoint_dir/job_ID/file_name`. Multiple jobs can checkpoint into the same directory. The system can create multiple files.

The checkpoint directory is used for restarting the job (see `brestart(1)`). The checkpoint directory can be any valid path.

Optionally, specifies a checkpoint period in minutes. Specify a positive integer. The running job is checkpointed automatically every checkpoint period. The checkpoint period can be changed using `bchkpnt(1)`. Because checkpointing is a heavyweight operation, you should choose a checkpoint period greater than half an hour.

Optionally, specifies a custom checkpoint and restart method to use with the job. Use `method=default` to indicate to use the default LSF checkpoint and restart programs for the job, `echkpnt.default` and `erestart.default`.

The `echkpnt.method_name` and `erestart.method_name` programs must be in `LSF_SERVERDIR` or in the directory specified by `LSB_ECHKPNT_METHOD_DIR` (environment variable or set in `lsf.conf`).

If a custom checkpoint and restart method is already specified with `LSB_ECHKPNT_METHOD` (environment variable or in `lsf.conf`), the method you specify with `bsub -k` overrides this.

Process checkpointing is not available on all host types, and may require linking programs with a special libraries (see `libckpt.a(3)`). LSF invokes `echkpnt` (see `echkpnt(8)`) found in `LSF_SERVERDIR` to checkpoint the job. You can override the default `echkpnt` for the job by defining as environment variables or in `lsf.conf` `LSB_ECHKPNT_METHOD` and `LSB_ECHKPNT_METHOD_DIR` to point to your own `echkpnt`. This allows you to use other checkpointing facilities, including application-level checkpointing.

The checkpoint method directory should be accessible by all users who need to run the custom `echkpnt` and `erestart` programs.

Only running members of a chunk job can be checkpointed.

**-L *login\_shell*** Initializes the execution environment using the specified login shell. The specified login shell must be an absolute path. This is not necessarily the shell under which the job will be executed.

Login shell is not supported on Windows.

**-Lp *ls\_project\_name*** Assigns the job to the specified License Scheduler project.

**-M *mem\_limit*** Sets a per-process (soft) memory limit for all the processes that belong to this batch job (see `getrlimit(2)`).

By default, the limit is specified in KB. Use `LSF_UNIT_FOR_LIMITS` in `lsf.conf` to specify a larger unit for the the limit (MB, GB, TB, PB, or EB).

If `LSB_MEMLIMIT_ENFORCE` or `LSB_JOB_MEMLIMIT` are set to `y` in `lsf.conf`, LSF kills the job when it exceeds the memory limit. Otherwise, LSF passes the memory limit to the operating system. UNIX operating systems that support `RUSAGE_RSS` for `setrlimit()` can apply the memory limit to each process.

The following operating systems do not support the memory limit at the OS level:

- Windows
- Sun Solaris 2.x

**-m "*host\_name*[@*cluster\_name*][[!] | +[*pref\_level*]] | *host\_group*[[!] | +[*pref\_level*]] ..."**

Runs the job on one of the specified hosts.

By default, if multiple hosts are candidates, runs the job on the least-loaded host.

To change the order of preference, put a plus (+) after the names of hosts or host groups that you would prefer to use, optionally followed by a preference level. For preference level, specify a positive integer, with higher numbers indicating greater preferences for those hosts. For example, `-m "hostA groupB+2 hostC+1"` indicates that `groupB` is the most preferred and `hostA` is the least preferred.

The keyword `others` can be specified with or without a preference level to refer to other hosts not otherwise listed. The keyword `others` must be specified with at least one host name or host group, it cannot be specified by itself. For example, `-m "hostA+ others"` means that `hostA` is preferred over all other hosts.

If you also use `-q`, the specified queue must be configured to include all the hosts in the your host list. Otherwise, the job is not submitted. To find out what hosts are configured for the queue, use `bqueues -l`.

If the host group contains the keyword `all`, LSF will dispatch the job to any available host, even if the host is not defined for the specified queue.

To display configured host groups, use `bmgroup`.

For the MultiCluster job forwarding model, you cannot specify a remote host by name.

For parallel jobs, specify first execution host candidates when you want to ensure that a host has the required resources or runtime environment to handle processes that run on the first execution host.

To specify one or more hosts or host groups as first execution host candidates, add the (!) symbol after the host name, as shown in the following example:

```
bsub -n 2 -m "host1 host2! hostgroupA! host3 host4" my_parallel_job
```

LSF runs `my_parallel_job` according to the following steps:

- 1 LSF selects either `host2` or a host defined in `hostgroupA` as the first execution host for the parallel job.

---

**NOTE:** First execution host candidates specified at the job-level (command line) override candidates defined at the queue level (in `lsb.queues`).

---

- 2 If any of the first execution host candidates have enough processors to run the job, the entire job will run on the first execution host, and not on any other hosts.

In the example, if `host2` or a member of `hostgroupA` has two or more processors, the entire job will run on the first execution host.

- 3 If the first execution host does not have enough processors to run the entire job, LSF selects additional hosts that are not defined as first execution host candidates.

Follow these guidelines when you specify first execution host candidates:

- ❖ If you specify a host group, you must first define the host group in the file `lsb.hosts`.
- ❖ Do not specify a dynamic host group as a first execution host.

## Options

- ❖ Do not specify `all`, `allremote`, or `others`, or a host partition as a first execution host.
- ❖ Do not specify a preference (+) for a host identified by (!) as a first execution host candidate.
- ❖ For each parallel job, specify enough regular hosts to satisfy the processor requirement for the job. Once LSF selects a first execution host for the current job, the other first execution host candidates become unavailable to the current job, but remain available to other jobs as either regular or first execution hosts.
- ❖ You cannot specify first execution host candidates when you use the `brun` command.

In a MultiCluster environment, insert the (!) symbol after the cluster name, as shown in the following example:

```
bsub -n 2 -m "host2@cluster2! host3@cluster2" my_parallel_job
```

### **-n *min\_proc[,max\_proc]***

Submits a parallel job and specifies the number of processors required to run the job (some of the processors may be on the same multiprocessor host).

You can specify a minimum and maximum number of processors to use. The job can start if at least the minimum number of processors is available. If you do not specify a maximum, the number you specify represents the exact number of processors to use.

If `PARALLEL_SCHED_BY_SLOT=Y` in `lsb.params`, this option specifies the number of slots required to run the job, not the number of processors.

Jobs that request fewer slots than the minimum `PROCLIMIT` defined for the queue or application profile to which the job is submitted, or more slots than the maximum `PROCLIMIT` are rejected. If the job requests minimum and maximum job slots, the maximum slots requested cannot be less than the minimum `PROCLIMIT`, and the minimum slots requested cannot be more than the maximum `PROCLIMIT`.

For example, if the queue defines `PROCLIMIT=4 8`:

- ◆ `bsub -n 6` is accepted because it requests slots within the range of `PROCLIMIT`
- ◆ `bsub -n 9` is rejected because it requests more slots than the `PROCLIMIT` allows
- ◆ `bsub -n 1` is rejected because it requests fewer slots than the `PROCLIMIT` allows
- ◆ `bsub -n 6,10` is accepted because the minimum value 6 is within the range of the `PROCLIMIT` setting
- ◆ `bsub -n 1,6` is accepted because the maximum value 6 is within the range of the `PROCLIMIT` setting
- ◆ `bsub -n 10,16` is rejected because its range is outside the range of `PROCLIMIT`
- ◆ `bsub -n 1,3` is rejected because its range is outside the range of `PROCLIMIT`

See the `PROCLIMIT` parameter in `lsb.queues(5)` and `lsb.applications(5)` for more information.

In a MultiCluster environment, if a queue exports jobs to remote clusters (see the `SNDJOBS_TO` parameter in `lsb.queues(5)`), then the process limit is not imposed on jobs submitted to this queue.

Once at the required number of processors is available, the job is dispatched to the first host selected. The list of selected host names for the job are specified in the environment variables `LSB_HOSTS` and `LSB_MCPU_HOSTS`. The job itself is expected to start parallel components on these hosts and establish communication among them, optionally using `RES`.

Specify first execution host candidates using the `-m` option when you want to ensure that a host has the required resources or runtime environment to handle processes that run on the first execution host.

If you specify one or more first execution host candidates, LSF looks for a first execution host that satisfies the resource requirements. If the first execution host does not have enough processors or job slots to run the entire job, LSF looks for additional hosts.

**-o *output\_file*** Specify a file path. Appends the standard output of the job to the specified file. Sends the output by mail if the file does not exist, or the system has trouble writing to it.

If only a file name is specified, LSF writes the output file to the current working directory. If the current working directory is not accessible on the execution host after the job starts, LSF writes the standard output file to `/tmp/`.

If you use the special character `%J` in the name of the output file, then `%J` is replaced by the job ID of the job. If you use the special character `%I` in the name of the output file, then `%I` is replaced by the index of the job in the array, if the job is a member of an array. Otherwise, `%I` is replaced by 0 (zero).

---

**NOTE:** The file path can contain up to 4094 characters for UNIX and Linux, or up to 255 characters for Windows, including the directory, file name, and expanded values for `%J` (*job\_ID*) and `%I` (*index\_ID*).

---

If the parameter `LSB_STDOUT_DIRECT` in `lsf.conf` is set to `Y` or `y`, the standard output of a job is written to the file you specify as the job runs. If `LSB_STDOUT_DIRECT` is not set, it is written to a temporary file and copied to the specified file after the job finishes. `LSB_STDOUT_DIRECT` is not supported on Windows.

If you use `-o` without `-e` or `-eo`, the standard error of the job is stored in the output file.

If you use `-o` without `-N`, the job report is stored in the output file as the file header.

If you use both `-o` and `-N`, the output is stored in the output file and the job report is sent by mail. The job report itself does not contain the output, but the report will advise you where to find your output.

**-oo *output\_file*** Specify a file path. Overwrites the standard output of the job to the specified file if it exists, or sends the output to a new file if it does not exist. Sends the output by mail if the system has trouble writing to the file.

If only a file name is specified, LSF writes the output file to the current working directory. If the current working directory is not accessible on the execution host after the job starts, LSF writes the standard output file to `/tmp/`.

If you use the special character `%J` in the name of the output file, then `%J` is replaced by the job ID of the job. If you use the special character `%I` in the name of the output file, then `%I` is replaced by the index of the job in the array, if the job is a member of an array. Otherwise, `%I` is replaced by 0 (zero).

---

**NOTE:** The file path can contain up to 4094 characters for UNIX and Linux, or up to 255 characters for Windows, including the directory, file name, and expanded values for `%J` (*job\_ID*) and `%I` (*index\_ID*).

---

If the parameter `LSB_STDOUT_DIRECT` in `lsf.conf` is set to `Y` or `y`, the standard output of a job overwrites the output file you specify as the job runs, which will occur every time the job is submitted with the overwrite option, even if it is requeued manually or by the system. If `LSB_STDOUT_DIRECT` is not set, the output is written to a temporary file that overwrites the specified file after the job finishes. `LSB_STDOUT_DIRECT` is not supported on Windows.

If you use `-oo` without `-e` or `-eo`, the standard error of the job is stored in the output file.

If you use `-oo` without `-N`, the job report is stored in the output file as the file header.

If you use both `-oo` and `-N`, the output is stored in the output file and the job report is sent by mail. The job report itself does not contain the output, but the report will advise you where to find your output.

**-P *project\_name*** Assigns the job to the specified project.

On IRIX 6, you must be a member of the project as listed in `/etc/project(4)`. If you are a member of the project, then `/etc/projid(4)` maps the project name to a numeric project ID. Before the submitted job executes, a new array session (`newarraysess(2)`) is created and the project ID is assigned to it using `setprid(2)`.

**-p *process\_limit*** Sets the limit of the number of processes to *process\_limit* for the whole job. The default is no limit. Exceeding the limit causes the job to terminate.

**-q "*queue\_name ...*"** Submits the job to one of the specified queues. Quotes are optional for a single queue. The specified queues must be defined for the local cluster. For a list of available queues in your local cluster, use `bqueues`.

When a list of queue names is specified, LSF selects the most appropriate queue in the list for your job based on the job's resource limits, and other restrictions, such as the requested hosts, your accessibility to a queue, queue status (closed or open), etc. The order in which the queues are considered is the same order in which these queues are listed. The queue listed first is considered first.

**-R "*res\_req*"** Runs the job on a host that meets the specified resource requirements. A resource requirement string describes the resources a job needs. LSF uses resource requirements to select hosts for job execution.

**[-R "*res\_req*" ...]**

The size of the resource requirement string cannot exceed 512 characters. If you need to include a hyphen (`-`) within the string, enclose the text in single quotation marks, for example, `bsub -R "select[hname!='host06-x12']"`.

A resource requirement string is divided into the following sections. Each section has a different syntax.

- ◆ A selection section (*select*). The selection section specifies the criteria for selecting execution hosts from the system.
- ◆ An ordering section (*order*). The ordering section indicates how the hosts that meet the selection criteria should be sorted.
- ◆ A resource usage section (*rusage*). The resource usage section specifies the expected resource consumption of the task.
- ◆ A job spanning section (*span*). The job spanning section indicates if a parallel batch job should span across multiple hosts.
- ◆ A same resource section (*same*). The same section indicates that all processes of a parallel job must run on the same type of host.

The resource requirement string sections have the following syntax:

```
select[selection_string] order[order_string] rusage[usage_string
[, usage_string][| usage_string ...] span[span_string]
same[same_string]
```

The square brackets must be typed as shown for each section.

If no section name is given, then the entire string is treated as a selection string (*select[selection\_string]*). The *select* keyword may be omitted if the selection string is the first string in the resource requirement.

Any resource for run queue length, such as *r15s*, *r1m* or *r15m*, specified in the resource requirements refers to the normalized run queue length.

By default, memory (*mem*) and swap (*swp*) limits in *select[]* and *rusage[]* sections are specified in MB. Use *LSF\_UNIT\_FOR\_LIMITS* in *lsf.conf* to specify a larger unit for these limits (MB, GB, TB, PB, or EB).

For example, to submit a job which will run on Solaris 7 or Solaris 8:

```
bsub -R "so17 || so18" myjob
```

The following command runs the job called *myjob* on an HP-UX host that is lightly loaded (CPU utilization) and has at least 15 MB of swap memory available.

```
bsub -R "swp > 15 && hpux order[ut]" myjob
```

*bsub* also accepts multiple *-R* options for the *order*, *same*, *rusage*, and *select* sections. You can specify multiple strings instead of using the *&&* operator:

```
bsub -R "select[swp > 15]" -R "select[hpux] order[r15m]" -R
rusage[mem=100]" -R "order[ut]" -R "same[type]" -R
rusage[tmp=50:duration=60]" -R "same[model]" myjob
```

LSF merges the multiple *-R* options into one string and selects a host that meets all of the resource requirements. The number of *-R* option sections is unlimited, up to a maximum of 512 characters for the entire string.

---

**REMEMBER:** Use multiple *-R* options *only* with the *order*, *same*, *rusage*, and *select* sections of the resource requirements string and with the *bsub* and *bmod* commands.

---

## Options

You defined a resource called `bigmem` in `lsf.shared` and defined it as an exclusive resource for `hostE` in `lsf.cluster.mycluster`. Use the following command to submit a job that will run on `hostE`:

```
bsub -R "bigmem" myjob
```

or

```
bsub -R "defined(bigmem)" myjob
```

You configured a static shared resource for licenses for the Verilog application as a resource called `verilog_lic`. To submit a job that will run on a host when there is a license available:

```
bsub -R "select[defined(verilog_lic)] rusage[verilog_lic=1]" myjob
```

The following job requests 20 MB memory for the duration of the job, and 1 license for 2 minutes:

```
bsub -R "rusage[mem=20, license=1:duration=2]" myjob
```

The following job requests 20 MB of memory and 50 MB of swap space for 1 hour, and 1 license for 2 minutes:

```
bsub -R "rusage[mem=20:swp=50:duration=1h, license=1:duration=2]" myjob
```

The following job requests 20 MB of memory for the duration of the job, 50 MB of swap space for 1 hour, and 1 license for 2 minutes.

```
bsub -R "rusage[mem=20,swp=50:duration=1h, license=1:duration=2]" myjob
```

The following job requests 50 MB of swap space, linearly decreasing the amount reserved over a duration of 2 hours, and requests 1 license for 2 minutes:

```
bsub -R "rusage[swp=50:duration=2h:decay=1, license=1:duration=2]" myjob
```

The following job requests two resources with same duration but different decay:

```
bsub -R "rusage[mem=20:duration=30:decay=1, lic=1:duration=30]" myjob
```

You are running an application version 1.5 as a resource called `app_lic_v15` and the same application version 2.0.1 as a resource called `app_lic_v201`. The license key for version 2.0.1 is backward compatible with version 1.5, but the license key for version 1.5 will not work with 2.0.1.

Job-level resource requirement specifications that use the `||` operator take precedence over any queue-level resource requirement specifications.

- ◆ If you can only run your job using one version of the application, submit the job without specifying an alternative resource. To submit a job that will only use `app_lic_v201`:

```
bsub -R "rusage[app_lic_v201=1]" myjob
```

- ◆ If you can run your job using either version of the application, try to reserve version 2.0.1 of the application. If it is not available, you can use version 1.5. To submit a job that will try `app_lic_v201` before trying `app_lic_v15`:

```
bsub -R "rusage[app_lic_v201=1||app_lic_v15=1]" myjob
```

- ◆ If different versions of an application require different system resources, you can specify other resources in your `rusage` strings. To submit a job that will use 20 MB of memory for `app_lic_v201` or 20 MB of memory and 50 MB of swap space for `app_lic_v15`:

```
bsub -R "rusage[mem=20:app_lic_v15=1||mem=20:swp=50:app_lic_v201=1]" myjob
```

**-S *stack\_limit*** Sets a per-process (soft) stack segment size limit for each of the processes that belong to the batch job (see `getrlimit(2)`).

By default, the limit is specified in KB. Use `LSF_UNIT_FOR_LIMITS` in `lsf.conf` to specify a larger unit for the the limit (MB, GB, TB, PB, or EB).

**-s *signal*** Send the specified signal when a queue-level run window closes.

By default, when the window closes, LSF suspends jobs running in the queue (job state becomes SSUSP) and stops dispatching jobs from the queue.

Use `-s` to specify a signal number; when the run window closes, the job is signalled by this signal instead of being suspended.

**-sla *service\_class\_name***

Specifies the service class where the job is to run.

If the SLA does not exist or the user is not a member of the service class, the job is rejected.

If EGO-enabled SLA scheduling is configured with `ENABLE_DEFAULT_EGO_SLA` in `lsb.params`, jobs submitted without `-sla` are attached to the configured default SLA.

You can use `-g` with `-sla`. All jobs in a job group attached to a service class are scheduled as SLA jobs. It is not possible to have some jobs in a job group not part of the service class. Multiple job groups can be created under the same SLA. You can submit additional jobs to the job group without specifying the service class name again.

---

**TIP:** You should submit your jobs with a runtime limit (`-W` option) or you should specify a run time limit in a queue or application profile (`RUNLIMIT` in the queue definition in `lsb.queues` or `RUNLIMIT` in the application profile definition in `lsb.applications`). If you do not specify a run time limit, LSF automatically adjusts the optimum number of running jobs according to the observed run time of finished jobs.

---

Use `bsla` to display the properties of service classes configured in `LSB_CONFDIR/cluster_name/configdir/lsb.serviceclasses` (see `lsb.serviceclasses(5)`) and dynamic information about the state of each service class.

**-sp *priority*** Specifies user-assigned job priority which allow users to order their jobs in a queue. Valid values for priority are any integers between 1 and `MAX_USER_PRIORITY` (configured in `lsb.params`, displayed by `bparams -l`). Job priorities that are not valid are rejected. LSF and queue administrators can specify priorities beyond `MAX_USER_PRIORITY`.

The job owner can change the priority of their own jobs. LSF and queue administrators can change the priority of all jobs in a queue.

Job order is the first consideration to determine job eligibility for dispatch. Jobs are still subject to all scheduling policies regardless of job priority. Jobs with the same priority are ordered first come first served.

User-assigned job priority can be configured with automatic job priority escalation to automatically increase the priority of jobs that have been pending for a specified period of time (`JOB_PRIORITY_OVER_TIME` in `lsb.params`).

When absolute priority scheduling is configured in the submission queue (APS\_PRIORITY in `lsb.queues`), the user-assigned job priority is used for the JRIORITY factor in the APS calculation.

**-T *thread\_limit*** Sets the limit of the number of concurrent threads to *thread\_limit* for the whole job. The default is no limit.

Exceeding the limit causes the job to terminate. The system sends the following signals in sequence to all processes belongs to the job: SIGINT, SIGTERM, and SIGKILL.

**-t *[[month:]day:]hour:minute***

Specifies the job termination deadline.

If a UNIX or Linux job is still running at the termination time, the job is sent a SIGUSR2 signal, and is killed if it does not terminate within ten minutes.

If a Windows job is still running at the termination time, it is killed immediately. (For a detailed description of how these jobs are killed, see `bkill`.)

In the queue definition, a TERMINATE action can be configured to override the `bkill` default action (see the JOB\_CONTROLS parameter in `lsb.queues(5)`).

In an application profile definition, a TERMINATE\_CONTROL action can be configured to override the `bkill` default action (see the TERMINATE\_CONTROL parameter in `lsb.applications(5)`).

The format for the termination time is `[[month:]day:]hour:minute` where the number ranges are as follows: month 1-12, day 1-31, hour 0-23, minute 0-59.

At least two fields must be specified. These fields are assumed to be *hour:minute*. If three fields are given, they are assumed to be *day:hour:minute*, and four fields are assumed to be *month:day:hour:minute*.

**-U *reservation\_ID*** If an advance reservation has been created with the `brsvadd` command, the `-U` option makes use of the reservation.

For example, if the following command was used to create the reservation `user1#0`,

```
brsvadd -n 1024 -m hostA -u user1 -b 13:0 -e 18:0
Reservation "user1#0" is created
```

The following command uses the reservation:

```
bsub -U user1#0 myjob
```

The job can only use hosts reserved by the reservation `user1#0`. LSF only selects hosts in the reservation. You can use the `-m` option to specify particular hosts within the list of hosts reserved by the reservation, but you cannot specify other hosts not included in the original reservation.

If you do not specify hosts (`bsub -m`) or resource requirements (`bsub -R`), the default resource requirement is to select hosts that are of any host type (LSF assumes "type==any" instead of "type==local" as the default select string).

If you later delete the advance reservation while it is still active, any pending jobs still keep the "type==any" attribute.

A job can only use one reservation. There is no restriction on the number of jobs that can be submitted to a reservation; however, the number of slots available on the hosts in the reservation may run out. For example, reservation `user2#0` reserves

128 slots on `hostA`. When all 128 slots on `hostA` are used by jobs referencing `user2#0`, `hostA` is no longer available to other jobs using reservation `user2#0`. Any single user or user group can have a maximum of 100 reservation IDs

Jobs referencing the reservation are killed when the reservation expires. LSF administrators can prevent running jobs from being killed when the reservation expires by changing the termination time of the job using the reservation (`bmod -t`) before the reservation window closes.

To use an advance reservation on a remote host, submit the job and specify the remote advance reservation ID. For example:

```
bsub -U user1#01@cluster1
```

In this example, we assume the default queue is configured to forward jobs to the remote cluster.

**-u *mail\_user*** Sends mail to the specified email destination. To specify a Windows user account, include the domain name in uppercase letters and use a single backslash (`DOMAIN_NAME\user_name`) in a Windows command line or a double backslash (`DOMAIN_NAME\\user_name`) in a UNIX command line.

**-v *swap\_limit*** Set the total process virtual memory limit to *swap\_limit* for the whole job. The default is no limit. Exceeding the limit causes the job to terminate.

By default, the limit is specified in KB. Use `LSF_UNIT_FOR_LIMITS` in `lsf.conf` to specify a larger unit for the the limit (MB, GB, TB, PB, or EB).

**-W [*hour:*]*minute*[/*host\_name* | /*host\_model*]**

Sets the runtime limit of the batch job. If a UNIX or Linux job runs longer than the specified run limit, the job is sent a SIGUSR2 signal, and is killed if it does not terminate within ten minutes. If a Windows job runs longer than the specified run limit, it is killed immediately. (For a detailed description of how these jobs are killed, see `bkill`.)

In the queue definition, a `TERMINATE` action can be configured to override the `bkill` default action (see the `JOB_CONTROLS` parameter in `lsb.queues(5)`).

In an application profile definition, a `TERMINATE_CONTROL` action can be configured to override the `bkill` default action (see the `TERMINATE_CONTROL` parameter in `lsb.applications(5)`).

If you want to provide LSF with an estimated run time without killing jobs that exceed this value, submit the job with `-We`, or define the `RUNTIME` parameter in `lsb.applications` and submit the job to that application profile. LSF uses the estimated runtime value for scheduling purposes only.

The run limit is in the form of [*hour:*]*minute*. The minutes can be specified as a number greater than 59. For example, three and a half hours can either be specified as `3:30`, or `210`.

The run limit you specify is the normalized run time. This is done so that the job does approximately the same amount of processing, even if it is sent to host with a faster or slower CPU. Whenever a normalized run time is given, the actual time on the execution host is the specified time multiplied by the CPU factor of the normalization host then divided by the CPU factor of the execution host.

If `ABS_RUNLIMIT=Y` is defined in `lsb.params`, the runtime limit and the runtime estimate are not normalized by the host CPU factor. Absolute wall-clock run time is used for all jobs submitted with a runtime limit or runtime estimate.

Optionally, you can supply a host name or a host model name defined in LSF. You must insert `'/'` between the run limit and the host name or model name. (See `lsinfo(1)` to get host model information.)

If no host or host model is given, LSF uses the default runtime normalization host defined at the queue level (`DEFAULT_HOST_SPEC` in `lsb.queues`) if it has been configured; otherwise, LSF uses the default CPU time normalization host defined at the cluster level (`DEFAULT_HOST_SPEC` in `lsb.params`) if it has been configured; otherwise, LSF uses the submission host.

For MultiCluster jobs, if no other CPU time normalization host is defined and information about the submission host is not available, LSF uses the host with the largest CPU factor (the fastest host in the cluster).

If the job also has termination time specified through the `bsub -t` option, LSF determines whether the job can actually run for the specified length of time allowed by the run limit before the termination time. If not, then the job will be aborted.

If the `IGNORE_DEADLINE` parameter is set in `lsb.queues(5)`, this behavior is overridden and the run limit is ignored.

Jobs submitted to a chunk job queue are not chunked if the run limit is greater than 30 minutes.

#### **-We [hour:]minute[/host\_name | /host\_model]**

Specifies an estimated run time for the job. LSF uses the estimated value for job scheduling purposes only, and does not kill jobs that exceed this value unless the jobs also exceed a defined runtime limit. The format of runtime estimate is same as run limit set by the `-W` option.

Use `JOB_RUNLIMIT_RATIO` in `lsb.params` to limit the runtime estimate users can set. If `JOB_RUNLIMIT_RATIO` is set to 0 no restriction is applied to the runtime estimate.

The job-level runtime estimate setting overrides the `RUNTIME` setting in an application profile in `lsb.applications`.

#### **-w 'dependency\_expression'**

LSF will not place your job unless the dependency expression evaluates to TRUE. If you specify a dependency on a job that LSF cannot find (such as a job that has not yet been submitted), your job submission fails.

The dependency expression is a logical expression composed of one or more dependency conditions. To make dependency expression of multiple conditions, use the following logical operators:

`&&` (AND)

`||` (OR)

`!` (NOT)

Use parentheses to indicate the order of operations, if necessary.

Enclose the dependency expression in single quotes (') to prevent the shell from interpreting special characters (space, any logic operator, or parentheses). If you use single quotes for the dependency expression, use double quotes for quoted items within it, such as job names.

In dependency conditions, job names specify only your own jobs, unless you are the LSF administrator. By default, if you use the job name to specify a dependency condition, and more than one of your jobs has the same name, all of your jobs that have that name must satisfy the test. If `JOB_DEP_LAST_SUB` in `lsb.params` is set to 1, the test is done on the job submitted most recently. Use double quotes (") around job names that begin with a number. In the job name, specify the wildcard character asterisk (\*) at the end of a string, to indicate all jobs whose name begins with the string. For example, if you use `jobA*` as the job name, it specifies jobs named `jobA`, `jobA1`, `jobA_test`, `jobA.log`, etc.

Use the \* with dependency conditions to define one-to-one dependency among job array elements such that each element of one array depends on the corresponding element of another array. The job array size must be identical.

For example:

```
bsub -w "done(myarrayA[*])" -J "myArrayB[1-10]" myJob2
```

indicates that before element 1 of `myArrayB` can start, element 1 of `myArrayA` must be completed, and so on.

You can also use the \* to establish one-to-one array element dependencies with `bmod` after an array has been submitted.

If you want to specify array dependency by array name, set `JOB_DEP_LAST_SUB` in `lsb.params`. If you do not have this parameter set, the job will be rejected if one of your previous arrays has the same name but a different index.

In dependency conditions, the variable *op* represents one of the following relational operators:

>  
>=  
<  
<=  
==  
!=

Use the following conditions to form the dependency expression.

**done(*job\_ID* | "*job\_name*" ...)**

The job state is DONE.

LSF refers to the oldest job of *job\_name* in memory.

**ended(*job\_ID* | "*job\_name*")**

The job state is EXIT or DONE.

**exit(*job\_ID* | "*job\_name*" [,*operator*] *exit\_code*)**

The job state is EXIT, and the job's exit code satisfies the comparison test.

If you specify an exit code with no operator, the test is for equality (== is assumed).

If you specify only the job, any exit code satisfies the test.

**external(*job\_ID* | "*job\_name*", "*status\_text*")**

The job has the specified job status.

If you specify the first word of the message description (no spaces), the text of the job's status begins with the specified word. Only the first word is evaluated.

***job\_ID* | "*job\_name*"**

If you specify a job without a dependency condition, the test is for the DONE state (LSF assumes the "done" dependency condition by default).

**numdone(*job\_ID*, *operator number* | \*)**

For a job array, the number of jobs in the DONE state satisfies the test. Use \* (with no operator) to specify all the jobs in the array.

**numended(*job\_ID*, *operator number* | \*)**

For a job array, the number of jobs in the DONE or EXIT states satisfies the test. Use \* (with no operator) to specify all the jobs in the array.

**numexit(*job\_ID*, *operator number* | \*)**

For a job array, the number of jobs in the EXIT state satisfies the test. Use \* (with no operator) to specify all the jobs in the array.

**numhold(*job\_ID*, *operator number* | \*)**

For a job array, the number of jobs in the PSUSP state satisfies the test. Use \* (with no operator) to specify all the jobs in the array.

**numpend(*job\_ID*, *operator number* | \*)**

For a job array, the number of jobs in the PEND state satisfies the test. Use \* (with no operator) to specify all the jobs in the array.

**numrun(*job\_ID*, *operator number* | \*)**

For a job array, the number of jobs in the RUN state satisfies the test. Use \* (with no operator) to specify all the jobs in the array.

**numstart(*job\_ID*, *operator number* | \*)**

For a job array, the number of jobs in the RUN, USUSP, or SSUSP states satisfies the test. Use \* (with no operator) to specify all the jobs in the array.

**post\_done(*job\_ID* | "*job\_name*")**

The job state is POST\_DONE (post-execution processing of the specified job has completed without errors).

**post\_err(*job\_ID* | "*job\_name*")**

The job state is POST\_ERR (post-execution processing of the specified job has completed with errors).

**started(*job\_ID* | "*job\_name*")**

The job state is:

- ◆ RUN, DONE, or EXIT
- ◆ PEND or PSUSP, and the job has a pre-execution command (`bsub -E`) that is running.

**-wa '[signal | command | CHKPNT]'**

Specifies the job action to be taken before a job control action occurs.

A job warning action must be specified with a job action warning time in order for job warning to take effect.

If `-wa` is specified, LSF sends the warning action to the job before the actual control action is taken. This allows the job time to save its result before being terminated by the job control action.

You can specify actions similar to the `JOB_CONTROLS` queue level parameter: send a signal, invoke a command, or checkpoint the job.

The warning action specified by `-wa` option overrides `JOB_WARNING_ACTION` in the queue. `JOB_WARNING_ACTION` is used as the default when no command line option is specified.

For example the following specifies that 2 minutes before the job reaches its runtime limit, an URG signal is sent to the job:

```
bsub -W 60 -wt '2' -wa 'URG' myjob
```

**-wt '[hour:]minute'** Specifies the amount of time before a job control action occurs that a job warning action is to be taken. Job action warning time is not normalized.

A job action warning time must be specified with a job warning action in order for job warning to take effect.

The warning time specified by the `bsub -wt` option overrides `JOB_ACTION_WARNING_TIME` in the queue.

`JOB_ACTION_WARNING_TIME` is used as the default when no command line option is specified.

For example the following specifies that 2 minutes before the job reaches its runtime limit, an URG signal is sent to the job:

```
bsub -W 60 -wt '2' -wa 'URG' myjob
```

**-Zs** Spools a job command file to the directory specified by the `JOB_SPOOL_DIR` parameter in `lsb.params`, and uses the spooled file as the command file for the job.

By default, the command file is spooled to

`LSB_SHAREDIR/cluster_name/lsf_cmddir`. If the `lsf_cmddir` directory does not exist, LSF creates it before spooling the file. LSF removes the spooled file when the job completes.

If `JOB_SPOOL_DIR` is specified, the `-Zs` option spools the command file to the specified directory and uses the spooled file as the input file for the job.

`JOB_SPOOL_DIR` can be any valid path up to a maximum length up to 4094 characters on UNIX and Linux or up to 255 characters for Windows.

`JOB_SPOOL_DIR` must be readable and writable by the job submission user, and it must be shared by the master host and the submission host. If the specified directory is not accessible or does not exist, `bsub -Zs` cannot write to the default directory `LSB_SHAREDIR/cluster_name/lsf_cmddir` and the job will fail.

The `-Zs` option is not supported for embedded job commands because LSF is unable to determine the first command to be spooled in an embedded job command.

**-h** Prints command usage to `stderr` and exits.

## Output

**-V** Prints LSF release version to `stderr` and exits.

***command* [*argument*]** The job can be specified by a command line argument *command*, or through the standard input if the command is not present on the command line. The *command* can be anything that is provided to a UNIX Bourne shell (see `sh(1)`). *command* is assumed to begin with the first word that is not part of a `bsub` option. All arguments that follow *command* are provided as the arguments to the *command*.

The job *command* can be up to 4094 characters long for UNIX and Linux or up to 255 characters for Windows. If no job name is specified with `-J`, `bjobs`, `bhist` and `bacct` displays the command as the job name.

If the batch job is not given on the command line, `bsub` reads the job commands from standard input. If the standard input is a controlling terminal, the user is prompted with `bsub>` for the commands of the job. The input is terminated by entering CTRL-D on a new line. You can submit multiple commands through standard input.

The commands are executed in the order in which they are given. `bsub` options can also be specified in the standard input if the line begins with `#BSUB`; e.g., `#BSUB -x`. If an option is given on both the `bsub` command line, and in the standard input, the command line option overrides the option in the standard input. The user can specify the shell to run the commands by specifying the shell path name in the first line of the standard input, such as `#!/bin/csh`. If the shell is not given in the first line, the Bourne shell is used. The standard input facility can be used to spool a user's job script; such as `bsub < script`.

See [Examples](#) for examples of specifying commands through standard input.

## Output

If the job is successfully submitted, displays the job ID and the queue to which the job has been submitted.

## Examples

```
bsub sleep 100
```

Submit the UNIX command `sleep` together with its argument `100` as a batch job.

```
bsub -q short -o my_output_file "pwd; ls"
```

Submit the UNIX command `pwd` and `ls` as a batch job to the queue named `short` and store the job output in `my_output` file.

```
bsub -m "host1 host3 host8 host9" my_program
```

Submit `my_program` to run on one of the candidate hosts: `host1`, `host3`, `host8` and `host9`.

```
bsub -q "queue1 queue2 queue3" -c 5 my_program
```

Submit `my_program` to one of the candidate queues: `queue1`, `queue2`, and `queue3` which are selected according to the CPU time limit specified by `-c 5`.

```
bsub -I ls
```

Submit a batch interactive job which displays the output of `ls` at the user's terminal.

```
bsub -Ip vi myfile
```

Submit a batch interactive job to edit `myfile`.

```
bsub -Is csh
```

Submit a batch interactive job that starts `csh` as an interactive shell.

```
bsub -b 20:00 -J my_job_name my_program
```

Submit `my_program` to run after 8 p.m. and assign it the job name `my_job_name`.

```
bsub my_script
```

Submit `my_script` as a batch job. Since `my_script` is specified as a command line argument, the `my_script` file is not spooled. Later changes to the `my_script` file before the job completes may affect this job.

```
bsub < default_shell_script
```

where `default_shell_script` contains:

```
sim1.exe
```

```
sim2.exe
```

The file `default_shell_script` is spooled, and the commands will be run under the Bourne shell since a shell specification is not given in the first line of the script.

```
bsub < csh_script
```

where `csh_script` contains:

```
#!/bin/csh
```

```
sim1.exe
```

```
sim2.exe
```

`csh_script` is spooled and the commands will be run under `/bin/csh`.

```
bsub -q night < my_script
```

where `my_script` contains:

```
#!/bin/sh
```

```
#BSUB -q test
```

```
#BSUB -o outfile -e errfile # my default stdout, stderr files
```

```
#BSUB -m "host1 host2" # my default candidate hosts
```

```
#BSUB -f "input > tmp" -f "output << tmp"
```

```
#BSUB -D 200 -c 10/host1
```

```
#BSUB -t 13:00
```

```
#BSUB -k "dir 5"
```

```
sim1.exe
```

```
sim2.exe
```

The job is submitted to the `night` queue instead of `test`, because the command line overrides the script.

```
bsub -b 20:00 -J my_job_name
```

```
bsub> sleep 1800
```

```
bsub> my_program
```

```
bsub> CTRL-D
```

The job commands are entered interactively.

```
bsub -T 4 myjob
```

Submits `myjob` with a maximum number of concurrent threads of 4.

```
bsub -W 15 -sla Kyuquot sleep 100
```

Submit the UNIX command `sleep` together with its argument 100 as a batch job to the service class named `Kyuquot`.

Limitations

## Limitations

When using account mapping the command `bpeek(1)` will not work. File transfer via the `-f` option to `bsub(1)` requires `rcp(1)` to be working between the submission and execution hosts. Use the `-N` option to request mail, and/or the `-o` and `-e` options to specify an output file and error file, respectively.

## See Also

[bjobs](#), [bkill](#), [bqueues](#), [bhosts](#), [bmgroup](#), [bmod](#), [bchkpnt](#), [brestart](#), [bgadd](#), [bgdel](#), [bjgroup](#), `sh`, `getrlimit`, `sbrk`, `libckpt.a`, `lsb.users`, `lsbqueues`, `lsb.params`, `lsb.hosts`, `lsb.serviceclasses`, `mbatchd`

# bswitch

switches unfinished jobs from one queue to another

## Synopsis

```
bswitch [-J job_name] [-m host_name | -m host_group] [-q queue_name]  
        [-u user_name | -u user_group | -u all] destination_queue [0]  
bswitch destination_queue [job_ID | "job_ID[index_list]"] ...  
bswitch [-h | -V]
```

## Description

Switches one or more of your unfinished jobs to the specified queue. LSF administrators and `root` can switch jobs submitted by other users.

By default, switches one job, the most recently submitted job, or the most recently submitted job that also satisfies other specified options (`-m`, `-q`, `-u`, or `-J`). Specify `0` (zero) to switch multiple jobs.

The switch operation can be done only if a specified job is acceptable to the new queue as if it were submitted to it, and, in case the job has been dispatched to a host, if the host can be used by the new queue. If the switch operation is unsuccessful, the job stays where it is.

If a switched job has not been dispatched, then its behavior will be as if it were submitted to the new queue in the first place.

If a switched job has been dispatched, then it will be controlled by the `loadSched` and `loadStop` vectors and other configuration parameters of the new queue, but its nice value and resource limits will remain the same.

Also, if a switched job has been dispatched, it will be controlled by the `PRIORITY` and `RUN_WINDOW` configuration parameters of the new queue.

Members of a chunk job can be switched to another queue. Running chunk job members are removed from the chunk and switched; all other WAIT jobs are requeued to PENDING. For chunk jobs in WAIT state, only the WAIT job is removed from the chunk and switched, and requeued to PENDING.

The `bswitch` command is useful to change a job's attributes inherited from the queue.

## Options

**0** (Zero). Switches multiple jobs. Switches all the jobs that satisfy other specified options (`-m`, `-q`, `-u` and `-J`).

**-J *job\_name*** Only switches jobs that have the specified job name.

**-m *host\_name* | -m *host\_group***

Only switches jobs dispatched to the specified host or host group.

**-q *queue\_name*** Only switches jobs in the specified queue.

**-u *user\_name* | -u *user\_group* | -u *all***

## Limitations

Only switches jobs submitted by the specified user, or all users if you specify the keyword `all`. To specify a Windows user account, include the domain name in uppercase letters and use a single backslash (`DOMAIN_NAME\user_name`) in a Windows command line or a double backslash (`DOMAIN_NAME\\user_name`) in a UNIX command line.

If you specify a user group, switches jobs submitted by all users in the group.

***destination\_queue*** Required. Specify the queue to which the job is to be moved.

***job\_ID ... ["job\_ID[index\_list]" ...***

Switches only the specified jobs.

**-h** Prints command usage to `stderr` and exits.

**-v** Prints LSF release version to `stderr` and exits.

## Limitations

You cannot switch a MultiCluster job.

## See Also

[bqueues\(1\)](#), [bhosts\(1\)](#), [bugroup\(1\)](#), [bsub\(1\)](#), [bjobs\(1\)](#)

# btop

moves a pending job relative to the first job in the queue

## Synopsis

```
btop job_ID | "job_ID[index_list]" [position]
```

```
btop [-h | -V]
```

## Description

Changes the queue position of a pending job or a pending job array element, to affect the order in which jobs are considered for dispatch.

By default, LSF dispatches jobs in a queue in the order of their arrival (that is, first-come-first-served), subject to availability of suitable server hosts.

The `btop` command allows users and the LSF administrator to manually change the order in which jobs are considered for dispatch. Users can only operate on their own jobs, whereas the LSF administrator can operate on any user's jobs. Users can only change the relative position of their own jobs.

If invoked by the LSF administrator, `btop` moves the selected job before the first job with the same priority submitted to the queue. The positions of all users' jobs in the queue can be changed by the LSF administrator.

If invoked by a regular user, `btop` moves the selected job before the first job with the same priority submitted by the user to the queue. Pending jobs are displayed by `bjobs` in the order in which they will be considered for dispatch.

A user may use `btop` to change the dispatch order of his/her jobs scheduled using a fairshare policy. However, if a job scheduled using a fairshare policy is moved by the LSF administrator using `btop`, the job will not be subject to further fairshare scheduling unless the same job is subsequently moved by the LSF administrator using `bbot`; in this case the job will be scheduled again using the same fairshare policy (see the `FAIRSHARE` keyword in `lsb.queues(5)` and `HostPartition` keyword in `lsb.hosts(5)`).

To prevent users from changing the queue position of a pending job with `btop`, configure `JOB_POSITION_CONTROL_BY_ADMIN=Y` in `lsb.params`.

You cannot run `btop` on jobs pending in an absolute priority scheduling (APS) queue.

## Options

***job\_ID* | "*job\_ID[index\_list]*"**

Required. Job ID of the job or of the job array on which to operate.

For a job array, the index list, the square brackets, and the quotation marks are required. An index list is used to operate on a job array. The index list is a comma separated list whose elements have the syntax `start_index[-end_index[:step]]` where `start_index`, `end_index` and `step` are positive integers. If the step is omitted, a

## See Also

step of one is assumed. The job array index starts at one. The maximum job array index is 1000. All jobs in the array share the same `job_ID` and parameters. Each element of the array is distinguished by its array index.

***position*** Optional. The *position* argument can be specified to indicate where in the queue the job is to be placed. `position` is a positive number that indicates the target position of the job from the beginning of the queue. The positions are relative to only the applicable jobs in the queue, depending on whether the invoker is a regular user or the LSF administrator. The default value of 1 means the position is before all the other jobs in the queue that have the same priority.

**-h** Prints command usage to `stderr` and exits

**-v** Prints LSF release version to `stderr` and exits

## See Also

[bbot\(1\)](#), [bjobs\(1\)](#), [bswitch\(1\)](#)

# bugroup

displays information about user groups

## Synopsis

```
bugroup [-l] [-r] [-w] [user_group ...]
```

```
bugroup [-h | -V]
```

## Description

Displays user groups and user names for each group.

The default is to display information about all user groups.

## Options

- l** Displays information in a long multi-line format. Also displays share distribution if shares are configured.
- r** Expands the user groups recursively. The expanded list contains only user names; it does not contain the names of subgroups. Duplicate user names are listed only once.
- w** Wide format. Displays user and user group names without truncating fields.
- user\_group* ...** Only displays information about the specified user groups. Do not use quotes when specifying multiple user groups.
- h** Prints command usage to `stderr` and exits.
- v** Prints LSF release version to `stderr` and exits.

## Output

In the list of users, a name followed by a slash (/) indicates a subgroup.

## Files

User groups and user shares are defined in the configuration file `lsb.users(5)`.

## See Also

`lsb.users(5)`, `bmggroup(1)`, `busers(1)`

# busers

displays information about users and user groups

## Synopsis

```
busers [-w] [user_name ... | user_group ... | all]
```

```
busers [-h | -V]
```

## Description

Displays information about users and user groups.

By default, displays information about the user who runs the command.

## Options

***user\_name* ... | *user\_group* ... | all**

Displays information about the specified users or user groups, or about all users if you specify `all`. To specify a Windows user account, include the domain name in uppercase letters and use a single backslash (`DOMAIN_NAME\user_name`) in a Windows command line or a double backslash (`DOMAIN_NAME\\user_name`) in a UNIX command line.

- h** Prints command usage to `stderr` and exits.
- V** Prints LSF release version to `stderr` and exits.
- w** Prints user and user group pending job thresholds and exits.

## Output

A listing of the users and user groups is displayed with the following fields:

### USER/GROUP

The name of the user or user group.

### JL/P

The maximum number of job slots that can be processed simultaneously for the specified users on each processor. For non-preemptive scheduling, these job slots are used by running and suspended jobs or by pending jobs which have jobs slots reserved for them. For preemptive scheduling, these job slots are used by running jobs or by pending jobs which have slots reserved for them. (see the description of `PREEMPTION` in `lsb.queues(5)`). This job limit is configured per processor so that multiprocessor hosts have more job slots. If the dash character (-) is displayed, there is no limit. `JL/P` is defined in the LSF configuration file `lsb.users(5)`.

### MAX

The maximum number of job slots that can be processed concurrently for the specified users' jobs. For non-preemptive scheduling, these job slots are used by running and suspended jobs or by pending jobs which have job slots reserved for them. For preemptive scheduling, these job slots are used by running jobs or by

pending jobs which have job slots reserved for them. (see the description of `PREEMPTIVE` in `lsb.queues(5)`). If the character ‘-’ is displayed, there is no limit. `MAX` is defined by the `MAX_JOBS` parameter in the configuration file `lsb.users(5)`.

## NJOBS

The current number of job slots used by specified users’ jobs. A parallel job that is pending is counted as  $n$  job slots for it will use  $n$  job slots in the queue when it is dispatched.

## PEND

The number of pending job slots used by jobs of the specified users.

## RUN

The number of job slots used by running jobs of the specified users.

## SSUSP

The number of job slots used by the system-suspended jobs of the specified users.

## USUSP

The number of job slots used by user-suspended jobs of the specified users.

## RSV

The number of job slots used by pending jobs of the specified users which have job slots reserved for them.

## MPEND

The pending job threshold for the specified users or user groups. `MPEND` is defined by the `MAX_PEND_JOBS` parameter in the configuration file `lsb.users(5)`.

## See Also

[bugroup\(1\)](#), [lsb.users\(5\)](#), [lsb.queues\(5\)](#)

ch

# ch

changes the host on which subsequent commands are to be executed

## Synopsis

```
ch [-S] [-t] [host_name]
```

```
ch [-h | -V]
```

## Description

Changes the host on which subsequent commands are to be executed.

By default, if no arguments are specified, changes the current host to the home host, the host from which the `ch` command was issued.

By default, executes commands on the home host.

By default, shell mode support is not enabled.

By default, does not display execution time of tasks.

The `ch` command allows you to quickly change to a designated host with the same execution environment. A simple shell is started that delivers all subsequent commands (except built-in commands) to the designated host for execution.

When the simple shell starts, it is in the current working directory and has the same command execution environment as that of the parent shell. Every remotely dispatched command is executed with the same environment as that on the home host. The syntax of the `ch` command is similar to that of the Bourne shell. However, there are some important differences.

The ampersand (&) following a command line (representing a background job in the Bourne shell) is ignored by `ch`. You can submit background jobs in `ch` with the built-in `post` command and bring them into the foreground with the built-in `contact` command (see below for details).

`ch` recognizes a `~` (tilde) as a special path name. If a `~` (tilde) is followed by a space, tab, new line or `/` (slash) character, then the `~` character is translated into the user's home directory. Otherwise, the `~` is translated as the home directory of the user name given by the string following the `~` character. Pipelines, lists of commands and redirection of standard input/output are all handled by invoking `/bin/sh`.

The following sequence of commands illustrates the behavior of the `ch` command. For example, the user is currently on `hostA`:

```
ch hostB
hostB> ch hostC
hostC> ch
hostA> ... ..
```

## Options

- S** Starts remote tasks with shell mode support. Shell mode support is required for running interactive shells or applications which redefine the `CTRL-C` and `CTRL-Z` keys (for example, `jove`).

- t** Turns on the timing option. The amount of time each subsequent command takes to execute is displayed.
- host\_name** Executes subsequent commands on the specified host.
- h** Prints command usage to `stderr` and exits.
- v** Prints LSF release version to `stderr` and exits.

## Usage

The `ch` command interprets the following built-in commands:

**cd [directory\_name]** Changes the current working directory to the specified directory. If a directory is not specified, changes to the user's home directory by default.

**ch [host\_name]** Changes the current working host to the specified host. If a host is not specified, changes to the home host by default.

**post [command [argument ...]]**

Posts the specified command for execution in the background on the current working host. `ch` assigns a unique task ID to this command and displays this ID, then continues to interact with the user. However, the output of background jobs may disturb the screen. You can post multiple commands on one host or on different hosts. When a previously posted command is completed, `ch` reports its status to the standard error. If a command is not specified, `ch` displays all currently running background commands.

**contact task\_ID** Brings a previously posted background command into the foreground. `task_ID` is the ID returned by the `post` command. Standard input is now passed to this foreground command. You cannot put an active foreground job into the background. A command that has been brought into the foreground with the `contact` command cannot be put back into the background.

**exit** Exits `ch` if there are no posted commands running. Typing an EOF character (usually `CTRL-D` but may be set otherwise, see `stty(1)`) forces `ch` to exit; uncompleted posted commands are killed.

## Limitations

Currently, the `ch` command does not support `script`, `history`, nor `alias`.

The `ch` prompt is always the current working host:current working directory followed by a `>` (right angle bracket) character. If the `ch` session is invoked by a shell that supports job control (such as `tcsh` or `ksh`), `CTRL-Z` suspends the whole `ch` session. The exit status of a command line is printed to `stderr` if the status is non-zero.

## See Also

[lrun\(1\)](#), [rsh\(1\)](#), [stty\(1\)](#)

# lsacct

displays accounting statistics on finished RES tasks in the LSF system

## Synopsis

```
lsacct [-l] [-C time0,time1] [-S time0,time1] [-f logfile_name]
      [-m host_name] [-u user_name ... | -u all] [pid ...]
lsacct [-h | -V]
```

## Description

Displays statistics on finished tasks run through RES. When a remote task completes, RES logs task statistics in the task log file.

By default, displays accounting statistics for only tasks owned by the user who invoked the `lsacct` command.

By default, displays accounting statistics for tasks executed on all hosts in the LSF system.

By default, displays statistics for tasks logged in the task log file currently used by RES: `LSF_RES_ACCTDIR/lsf.acct.host_name` or `/tmp/lsf.acct.host_name` (see `lsf.acct(5)`).

If `-l` is not specified, the default is to display the fields in SUMMARY only (see OUTPUT).

The RES on each host writes its own accounting log file. These files can be merged using the `lsacctmrg` command to generate statistics for the entire LSF cluster.

All times are reported in seconds. All sizes are reported in kilobytes.

## Options

- l** Per-task statistics. Displays statistics about each task. See OUTPUT for a description of information that is displayed.
- C *time0,time1*** Displays accounting statistics for only tasks that completed or exited during the specified time interval.  
The time format is the same as in `bhist(1)`.
- f *logfile\_name*** Searches the specified task log file for accounting statistics. Specify either an absolute or a relative path.  
Useful for analyzing old task log files or files merged with the `lsacctmrg` command.
- m *host\_name ...*** Displays accounting statistics for only tasks executed on the specified hosts.  
If a list of hosts is specified, host names must be separated by spaces and enclosed in quotation marks (") or (').
- S *time0,time1*** Displays accounting statistics for only tasks that began executing during the specified time interval.  
The time format is the same as in `bhist(1)`.

- u *user\_name* ... | -u all** Displays accounting statistics for only tasks owned by the specified users, or by all users if the keyword `all` is specified.  
If a list of users is specified, user names must be separated by spaces and enclosed in quotation marks (") or ('). You can specify both user names and user IDs in the list of users. To specify a Windows user account, include the domain name in uppercase letters and use a single backslash (*DOMAIN\_NAME\user\_name*) in a Windows command line or a double backslash (*DOMAIN\_NAME\\user\_name*) in a UNIX command line.
- pid ...** Displays accounting statistics for only tasks with the specified pid. This option overrides all other options except for `-l`, `-f`, `-h`, `-V`.
- h** Prints command usage to `stderr` and exits.
- v** Prints LSF release version to `stderr` and exits.

## Output

### SUMMARY (default format)

Overall statistics for tasks.

The total, average, maximum and minimum resource usage statistics apply to all specified tasks.

The following fields are displayed:

#### Total number of tasks

Total number of tasks including tasks completed successfully and total number of exited tasks.

#### Time range of started tasks

Start time of the first and last task selected.

#### Time range of ended tasks

Completion or exit time of the first and last task selected.

#### Resource usage of tasks selected

See `getrusage(2)`.

**CPU time** Total CPU time consumed by the task.

**Page faults** Number of page faults.

**Swaps** Number of times the process was swapped out.

**Blocks in** Number of input blocks.

**Blocks out** Number of output blocks.

**Messages sent** Number of System V IPC messages sent.

**Messages rcvd** Number of IPC messages received.

## Files

**Voluntary cont sw** Number of voluntary context switches.

**Involuntary con sw** Number of involuntary context switches.

**Turnaround** Elapsed time from task execution to task completion.

## Per Task Statistics (-l)

In addition to the fields displayed by default in SUMMARY, displays the following fields for each task:

**Starting time** Time the task started.

**User and host name** User who submitted the task, host from which the task was submitted, in the format *user\_name@host*.

**PID** UNIX process ID of the task.

**Execution host** Host on which the command was run.

**Command line** Complete command line that was executed.

**CWD** Current working directory of the task.

**Completion time** Time at which the task completed.

**Exit status** UNIX exit status of the task.

## Files

Reads `lsf.acct.host_name`

## See Also

`lsf.acct(5)`, `lsacctmrg(1)`, `res(8)`, `bhist(1)`

# lsacctmrg

merges task log files

## Synopsis

```
lsacctmrg [-f] logfile_name ... target_logfile_name
```

```
lsacctmrg [-h | -V]
```

## Description

Merges specified task log files into the specified target file in chronological order according to completion time.

All files must be in the format specified in `lsf.acct` (see `lsf.acct(5)`).

## Options

- f** Overwrites the target file without prompting for confirmation.
- logfile\_name ...** Specify log files to be merged into the target file, separated by spaces. Specify either an absolute or a relative path.
- target\_logfile\_name** Specify the file into which all log files are to be merged. Specify either an absolute or a relative path. The target file cannot be part of the files to be merged.
- h** Prints command usage to `stderr` and exits.
- V** Prints LSF release version to `stderr` and exits.

## See Also

`lsf.acct(5)`, `res(8)`

# lsadmin

administrative tool for LSF

## Synopsis

```
lsadmin subcommand
```

```
lsadmin [-h | -V]
```

## Description

---

**CAUTION:** This command can only be used by LSF administrators.

---

`lsadmin` is a tool that executes privileged commands to control LIM and RES operations in the LSF cluster.

If no subcommands are supplied for `lsadmin`, `lsadmin` prompts for subcommands from the standard input.

For subcommands for which multiple host names or host groups can be specified, do not enclose the multiple names in quotation marks.

## Subcommand List

```
ckconfig [-v]
reconfig [-f] [-v]
limstartup [-f] [host_name ... | all]
limshutdown [-f] [host_name ... | all]
limrestart [-v] [-f] [host_name ... | all]
limlock [-l time_seconds]
limunlock
resstartup [-f] [host_name ... | all]
resshutdown [-f] [host_name ... | all]
resrestart [-f] [host_name ... | all]
reslogon [-c cpu_time] [host_name ... | all]
reslogoff [host_name ... | all]
limdebug [-c "class_name ..."] [-l debug_level] [-f logfile_name] [-o]
["host_name ..."]
resdebug [-c "class_name"] [-l debug_level] [-f logfile_name] [-o]
["host_name ..."]
limtime [-l timing_level] [-f logfile_name] [-o] ["host_name ..."]
restime [-l timing_level] [-f logfile_name] [-o] ["host_name ..."]
showconf lim [host_name ... | all]
help [subcommand ...] | ? [subcommand ...]
quit
```

-h

-v

## Options

**subcommand** Executes the specified subcommand. See Usage section.

**-h** Prints command usage to `stderr` and exits.

**-v** Prints LSF release version to `stderr` and exits.

## Usage

**ckconfig [-v]** Checks LSF configuration files.

**-v**

Displays detailed messages about configuration file checking.

**reconfig [-f] [-v]** Restarts LIMs on all hosts in the cluster. You should use `reconfig` after changing configuration files. The configuration files are checked before all LIMs in the cluster are restarted. If the configuration files are not correct, reconfiguration will not be initiated.

If `LSF_MASTER_LIST` is specified in `lsf.conf`, you are prompted to confirm the reconfiguration for only the master candidate hosts.

**-f**

Disables user interaction and forces LIM to restart on all hosts in the cluster if no fatal errors are found. This option is useful in batch mode.

**-v**

Displays detailed messages about configuration file checking.

**limstartup [-f] [host\_name ... |all]**

Starts LIM on the local host if no arguments are specified.

Starts LIMs on the specified hosts or on all hosts in the cluster if the word `all` is the only argument provided. You are prompted to confirm LIM startup.

Only `root` and users listed in the parameter `LSF_STARTUP_USERS` in `lsf.sudoers(5)` can use the `all` and `-f` options to start LIM as `root`.

These users must also be able to use `rsh` or `ssh` on all LSF hosts without having to type in passwords. If permission to start up LIMs as `root` is not configured, `limstartup` will start up LIMs as yourself after your confirmation.

The shell command specified by `LSF_RSH` in `lsf.conf` is used before `rsh` is tried.

**-f**

Disables interaction and does not ask for confirmation for starting LIMs.

**limshutdown [-f] [host\_name ... |all]**

Shuts down LIM on the local host if no arguments are supplied.

Shuts down LIMs on the specified hosts or on all hosts in the cluster if the word `all` is specified. You are prompted to confirm LIM shutdown.

**-f**

Disables interaction and does not ask for confirmation for shutting down LIMs.

**limrestart [-v] [-f] [host\_name ... | all]**

Restarts LIM on the local host if no arguments are supplied.

Restarts LIMs on the specified hosts or on all hosts in the cluster if the word `all` is specified. You are prompted to confirm LIM restart.

`limrestart` should be used with care. Do not make any modifications until all the LIMs have completed the startup process. If you execute `limrestart host_name . . .` to restart some of the LIMs after changing the configuration files, but other LIMs are still running the old configuration, confusion will arise among these LIMs. To avoid this situation, use `reconfig` instead of `limrestart`.

**-v**

Displays detailed messages about configuration file checking.

**-f**

Disables user interaction and forces LIM to restart if no fatal errors are found. This option is useful in batch mode. `limrestart -f all` is the same as `reconfig -f`.

**limlock [-l time\_seconds]**

Locks LIM on the local host until it is explicitly unlocked if no time is specified. When a host is locked, LIM's load status becomes `lockU`. No job will be sent to a locked host by LSF.

**-l time\_seconds**

The host is locked for the specified time in seconds.

LSF suspends all non-exclusive jobs running on the host. This is useful if a machine is running an exclusive job requiring all the available CPU time and/or memory. If `LSB_DISABLE_LIMLOCK_EXCL=y` (to enable preemption of exclusive jobs, for example) LSF suspends all jobs, including exclusive jobs.

**limunlock** Unlocks LIM on the local host.

**resstartup [-f] [host\_name ... | all]**

Starts RES on the local host if no arguments are specified.

Starts RESs on the specified hosts or on all hosts in the cluster if the word `all` is specified. You are prompted to confirm RES startup.

Only `root` and users defined by the `LSF_STARTUP_USERS` parameter in `lsf.sudoers(5)` can use the `all` and `-f` options to start RES as `root`.

These users must be able to use `rsh` or `ssh` on all LSF hosts without having to type in passwords. For `root` installation to work properly, `lsadmin` must be installed as a `setuid` to `root` program.

The shell command specified by `LSF_RSH` in `lsf.conf` is used before `rsh` is tried.

**-f**

Disables interaction and does not ask for confirmation for starting RESs.

**resshutdown [-f] [host\_name ... | all]**

Shuts down RES on the local host if no arguments are specified.

Shuts down RESs on the specified hosts or on all hosts in the cluster if the word `all` is specified. You are prompted to confirm RES shutdown.

If RES is running, it will keep running until all remote tasks exit.

**-f**

Disables interaction and does not ask for confirmation for shutting down RESs.

**resrestart [-f] [*host\_name* ... | all]**

Restarts RES on the local host if no arguments are specified.

Restarts RESs on the specified hosts or on all hosts in the cluster if the word `all` is specified. You are prompted to confirm RES restart.

If RES is running, it will keep running until all remote tasks exit. While waiting for remote tasks to exit, another RES is restarted to serve the new queries.

**-f**

Disables interaction and does not ask for confirmation for restarting RESs.

**reslogon [-c *cpu\_time*] [*host\_name* ... | all]**

Logs all tasks executed by RES on the local host if no arguments are specified.

Logs tasks executed by RESs on the specified hosts or on all hosts in the cluster if `all` is specified.

RES will write the task's resource usage information into the log file `lsf.acct.host_name`. The location of the log file is determined by `LSF_RES_ACCTDIR` defined in `lsf.conf`. If `LSF_RES_ACCTDIR` is not defined, or RES cannot access it, the log file will be created in `/tmp` instead.

**-c *cpu\_time***

Logs only tasks that use more than the specified amount of CPU time. The amount of CPU time is specified by `cpu_time` in milliseconds.

**reslogoff [*host\_name* ... | all]**

Turns off RES task logging on the specified hosts or on all hosts in the cluster if `all` is specified.

If no arguments are specified, turns off RES task logging on the local host.

**limdebug [-c "*class\_name* ..."] [-l *debug\_level*] [-f *logfile\_name*] [-o] ["*host\_name* ..."]**

Sets the message log level for LIM to include additional information in log files. You must be `root` or the LSF administrator to use this command.

If the command is used without any options, the following default values are used:

*class\_name*=0 (no additional classes are logged)

*debug\_level*=0 (LOG\_DEBUG level in parameter `LSF_LOG_MASK`)

*logfile\_name*=current LSF system log file in the LSF system log file directory, in the format `daemon_name.log.host_name`

*host\_name*= local host (host from which command was submitted)

In MultiCluster, debug levels can only be set for hosts within the same cluster. For example, you could not set debug or timing levels from a host in `clusterA` for a host in `clusterB`. You need to be on a host in `clusterB` to set up debug or timing levels for `clusterB` hosts.

**-c "class\_name ..."**

Specify software classes for which debug messages are to be logged. If a list of classes is specified, they must be enclosed in quotation marks and separated by spaces.

Possible classes:

LC\_AFS - Log AFS messages

LC\_AUTH - Log authentication messages

LC\_CHKPNT - log checkpointing messages

LC\_COMM - Log communication messages

LC\_CONF - Print out all parameters in `lsf.conf` (and `ego.conf`)

LC\_DCE - Log messages pertaining to DCE support

LC\_EXEC - Log significant steps for job execution

LC\_FILE - Log file transfer messages

LC\_HANG - Mark where a program might hang

LC\_LICENCE - Log license management messages

LC\_MULTI - Log messages pertaining to MultiCluster

LC\_PIM - Log PIM messages

LC\_SIGNAL - Log messages pertaining to signals

LC\_TRACE - Log significant program walk steps

LC\_XDR - Log everything transferred by XDR

Default: 0 (no additional classes are logged)-f

---

**NOTE:** Classes are also listed in `lsf.h`.

---

**-l debug\_level**

Specify level of detail in debug messages. The higher the number, the more detail that is logged. Higher levels include all lower levels.

Possible values:

0 - LOG\_DEBUG level in parameter LSF\_LOG\_MASK in `lsf.conf`.

1 - LOG\_DEBUG1 level for extended logging. A higher level includes lower logging levels. For example, LOG\_DEBUG3 includes LOG\_DEBUG2 LOG\_DEBUG1, and LOG\_DEBUG levels.

2 - LOG\_DEBUG2 level for extended logging. A higher level includes lower logging levels. For example, LOG\_DEBUG3 includes LOG\_DEBUG2 LOG\_DEBUG1, and LOG\_DEBUG levels.

3 - LOG\_DEBUG3 level for extended logging. A higher level includes lower logging levels. For example, LOG\_DEBUG3 includes LOG\_DEBUG2, LOG\_DEBUG1, and LOG\_DEBUG levels.

Default: 0 (LOG\_DEBUG level in parameter LSF\_LOG\_MASK)

**-f logfile\_name**

Specify the name of the file into which debugging messages are to be logged. A file name with or without a full path may be specified.

If a file name without a path is specified, the file will be saved in the LSF system log file directory.

The name of the file created has the following format:

*logfile\_name.daemon\_name.log.host\_name*

On UNIX, if the specified path is not valid, the log file is created in the /tmp directory.

On Windows, no log file is created.

Default: current LSF system log file in the LSF system log file directory, in the format *daemon\_name.log.host\_name*.

**-o**

Turns off temporary debug settings and reset them to the daemon starting state. The message log level is reset back to the value of LSF\_LOG\_MASK and classes are reset to the value of LSF\_DEBUG\_RES, LSF\_DEBUG\_LIM.

Log file is reset back to the default log file.

**"host\_name ..."**

Sets debug settings on the specified host or hosts.

Default: local host (host from which command was submitted)

**resdebug [-c "*class\_name*"] [-l *debug\_level*] [-f *logfile\_name*] [-o] ["*host\_name ...*"]**

Sets the message log level for RES to include additional information in log files. You must be the LSF administrator to use this command, not root.

See description of `limdebug` for an explanation of options.

**limtime [-l *timing\_level*] [-f *logfile\_name*] [-o] ["*host\_name ...*"]**

Sets timing level for LIM to include additional timing information in log files. You must be root or the LSF administrator to use this command.

If the command is used without any options, the following default values are used:

*timing\_level*=no timing information is recorded

*logfile\_name*=current LSF system log file in the LSF system log file directory, in the format *daemon\_name.log.host\_name*

*host\_name*=local host (host from which command was submitted)

In MultiCluster, timing levels can only be set for hosts within the same cluster. For example, you could not set debug or timing levels from a host in `clusterA` for a host in `clusterB`. You need to be on a host in `clusterB` to set up debug or timing levels for `clusterB` hosts.

**-l *timing\_level***

Specifies detail of timing information that is included in log files. Timing messages indicate the execution time of functions in the software and are logged in milliseconds.

Valid values: 1 | 2 | 3 | 4 | 5

The higher the number, the more functions in the software that are timed and whose execution time is logged. The lower numbers include more common software functions. Higher levels include all lower levels.

Default: undefined (no timing information is logged)

**-f logfile\_name**

Specify the name of the file into which timing messages are to be logged. A file name with or without a full path may be specified.

If a file name without a path is specified, the file will be saved in the LSF system log file directory.

The name of the file created has the following format:

*logfile\_name.daemon\_name.log.host\_name*

On UNIX, if the specified path is not valid, the log file is created in the /tmp directory.

On Windows, no log file is created.

---

**NOTE:** Both timing and debug messages are logged in the same files.

---

Default: current LSF system log file in the LSF system log file directory, in the format *daemon\_name.log.host\_name*.

**-o**

Turns off temporary timing settings and resets them to the daemon starting state. The timing level is reset back to the value of the parameter for the corresponding daemon (LSF\_TIME\_LIM, LSF\_TIME\_RES).

Log file is reset back to the default log file.

**"host\_name ..."**

Sets the timing level on the specified host or hosts.

Default: local host (host from which command was submitted)

**restime [-l timing\_level] [-f logfile\_name] [-o] ["host\_name ..."]**

Sets timing level for RES to include additional timing information in log files. You must be the LSF administrator can use this command, not root.

See description of `limtime` for an explanation of options.

**showconf lim [ host\_name ... | all ]**

Display all configured parameters and their values set in `lsf.conf` or `ego.conf` that affect `lim`.

Use `lsadmin showconf lim` to display the parameters configured in `lsf.conf` and `ego.conf` that apply to root LIM. By default, `lsadmin` displays the local LIM parameters. You can optionally specify the host to display the LIM parameters.

In a MultiCluster environment, `lsadmin showconf` only displays the parameters of daemons on the local cluster.

Running `lsadmin showconf` from a master candidate host will reach all server hosts in the cluster. Running `lsadmin showconf` from a slave-only host may not be able to reach other slave-only hosts.

You cannot run `lsadmin showconf lim` from client hosts. `lsadmin` shows only server host configuration, not client host configuration.

`lsadmin showconf` only displays the values used by LSF.

LIM reads EGO\_MASTER\_LIST from wherever it is defined. You can define either LSF\_MASTER\_LIST in `lsf.conf` or EGO\_MASTER\_LIST in `ego.conf`. LIM reads `lsf.conf` first, and `ego.conf` if EGO is enabled in the LSF cluster. LIM only takes the value of LSF\_MASTER\_LIST if EGO\_MASTER\_LIST is not defined at all in `ego.conf`.

For example, if EGO is enabled in the LSF cluster, and you define LSF\_MASTER\_LIST in `lsf.conf`, and EGO\_MASTER\_LIST in `ego.conf`, `lsadmin showconf` displays the value of EGO\_MASTER\_LIST in `ego.conf`.

If EGO is disabled, `ego.conf` not loaded, so whatever is defined in `lsf.conf` is displayed.

**help** [*subcommand ...*] | **?** [*subcommand ...*]

Displays the syntax and functionality of the specified commands. The commands must be explicit to `lsadmin`.

From the command prompt, you may use `help` or `?`.

**quit** Exits the `lsadmin` session.

## See Also

`ls_limcontrol`, `ls_rescontrol`, `ls_readconfenv`, `ls_gethostinfo`,  
`ls_connect`, `ls_initrex`, `lsf.conf`, `lsf.sudoers`, `lsf.acct`, [bmgrouper](#), [busers](#)

# lsclusters

displays configuration information about LSF clusters

## Synopsis

```
lsclusters [-l] [cluster_name ...]
```

```
lsclusters [-h | -V]
```

## Description

Displays configuration information about LSF clusters.

By default, returns information about the local cluster and all other clusters of which the local cluster is aware (all clusters defined in the `RemoteClusters` section of `lsf.cluster.cluster_name` if that section exists, otherwise all clusters defined in `lsf.shared`).

## Options

- l** Long format. Displays additional information.
- cluster\_name* ...** Only displays information about the specified clusters.
- h** Prints command usage to `stderr` and exits.
- V** Prints LSF release version to `stderr` and exits.

## Output

### Default Output

The information includes: cluster name, cluster master host, primary cluster administrator's login name, total number of hosts in the cluster, and the number of server hosts in the cluster.

A listing of the clusters is displayed with the following fields:

<b>CLUSTER_NAME</b>	The name of the cluster.
<b>STATUS</b>	The current status of the cluster. Possible values are: <ul style="list-style-type: none"> <li><b>ok</b> The cluster is in normal load sharing state, and will exchange load information with the local cluster.</li> <li><b>unavail</b> The cluster is unavailable.</li> </ul>
<b>MASTER_HOST</b>	The name of the cluster's master host.
<b>ADMIN</b>	The user account name of the cluster's primary LSF administrator.
<b>HOSTS</b>	Number of LSF static client and server hosts in the cluster. The HOSTS field does not include floating clients.

## SERVERS

Number of LSF server hosts in the cluster.

## Long Format (-l)

If this option is specified, the command will also list available resource names, host types, host models and cluster administrator's login names, and whether local cluster accepts or sends interactive jobs to this cluster.

## See Also

`lsfintro(1)`, `ls_info(3)`, `ls_policy(3)`, `ls_clusterinfo(3)` `lsf.cluster(5)`

# lselectible

displays whether a task is eligible for remote execution

## Synopsis

```
lselectible [-r] [-q] [-s] task
```

```
lselectible [-h | -V]
```

## Description

Displays whether the specified task is eligible for remote execution.

By default, only tasks in the remote task list are considered eligible for remote execution.

## Options

- q** Quiet mode. Displays only the resource requirement string defined for the task. The string ELIGIBLE or NON-ELIGIBLE is omitted.
- r** Remote mode. Considers eligible for remote execution any task not included in the local task list.
- s** Silent mode. No output is produced. The **-q** and **-s** options are useful for shell scripts which operate by testing the exit status (see DIAGNOSTICS).
- task** Specify a command.
- h** Prints command usage to `stderr` and exits.
- V** Prints LSF release version to `stderr` and exits.

## Output

If the task is eligible, the string ELIGIBLE followed by the resource requirements associated with the task are printed to `stdout`. Otherwise, the string NON-ELIGIBLE is printed to `stdout`.

If `lselectible` prints ELIGIBLE with no resource requirements, the task has the default requirements of CPU consumption and memory usage.

## Diagnostics

`lselectible` has the following exit statuses:

- 0 Task is eligible for remote execution
- 1 Command is to be executed locally
- 1 Syntax errors
- 10 A failure is detected in the LSF system

## See Also

`ls_eligible(3)`, `lsrtasks(1)`, `lsf.task(5)`

# lsfinstall

runs `lsfinstall`, the Platform LSF installation and configuration script

## Synopsis

```
lsfinstall -f install.config
lsfinstall -s -f slave.config
lsfinstall -h
```

## Description

`lsfinstall` runs the LSF installation scripts and configuration utilities to install a new Platform LSF cluster or upgrade LSF from a previous release.

To install a fully operational LSF cluster that all users can access, you should install as root.

You can run `lsfinstall` as a non-root user, with limitations.

## Required install.config variables

- ◆ `LSF_TOP="/path"`
- ◆ `LSF_ADMINS="user_name [user_name...]"`
- ◆ `LSF_CLUSTER_NAME="cluster_name"`

## Required slave.config variables

If you use `slave.config` for dynamic slave host installation, the following parameters are required:

- ◆ `LSF_TOP="/path"`
- ◆ `LSF_TARDIR="/path"`
- ◆ `LSF_SERVER_HOSTS="host_name [host_name ...]"`

## Variables that require an absolute path

- ◆ `LSF_LICENSE="/path/license_file"`
- ◆ `LSF_TOP="/path"`
- ◆ `LSF_TARDIR="/path"`

## What lsfinstall does

Before installing and configuring LSF, `lsfinstall` checks the installation prerequisites, and outputs the results to `lsfprechk.rpt`. `lsfinstall` writes any unrecoverable errors to the `Install.err` file and exits. You must correct these errors before continuing to install and configure LSF.

During installation, `lsfinstall` logs installation progress in the `Install.log` file, calls other utilities to uncompress, extract and copy product files, installs a license, and configures the cluster.

## Description

After installation, you should run `hostsetup` to set up each server host in the cluster. After setting up the server hosts, you should start your cluster and test the installation by running some basic commands.

## Where `lsfinstall` is located

`lsfinstall` is included in the LSF installation script tar file `lsf7Update2_lsfinstall.tar.Z` and is located in the `lsf7Update2_lsfinstall` directory created when you uncompress and extract installation script tar file.

After installation, `lsfinstall` is located in `LSF_TOP/7.0/install/`.

## Before running `lsfinstall`

### 1 Plan your installation by choosing:

- ❖ LSF installation directory on file server (e.g., `LSF_TOP="/usr/share/lsf"`)
- ❖ LSF hosts (master host, server hosts, and client-only hosts; e.g., `LSF_ADDSERVERS="hosta hostb hostc"`)
- ❖ Cluster name (39 characters or less with no white spaces; e.g., `LSF_CLUSTER_NAME="cluster1"`)

---

**IMPORTANT:** Do not use the name of any host, user, or user group as the name of your cluster.

---

- ❖ Primary LSF administrator (owns the LSF configuration files and log files; e.g., `LSF_ADMINS="lsfadmin"`)
- ❖ LSF server hosts that are candidates to become the master host for the cluster, if you are installing a new host to be dynamically added to the cluster (e.g., `LSF_MASTER_LIST="hosta hostb"`)

### 2 Prepare your systems for installation:

- ❖ Make sure the installation file system on the file server host has enough disk space for all hosts types (approximately 300 MB per host type).
- ❖ Make sure the top-level installation directory (`LSF_TOP`) is accessible with the same path name from all hosts in the cluster (e.g., `/usr/share/lsf`).
- ❖ Create user accounts for LSF administrators (e.g., `lsfadmin`).
- ❖ Read the “Release Notes for Platform LSF” (`/distrib/7.0/lsf7Update2_release_notes.html`) on the `ftp.platform.com` FTP site for detailed steps for downloading LSF distribution tar files
- ❖ Get the LSF installation script tar file `lsf7Update2_lsfinstall.tar.Z` and extract it. For example:  

```
# zcat lsf7Update2_lsfinstall.tar.Z | tar xvf -
```
- ❖ Read `lsf7Update2_lsfinstall/README` for information about the contents of `lsf7Update2_lsfinstall.tar.Z`.
- ❖ Get the distribution tar files for all host types you need.

- ❖ Put the distribution files in the same directory as `lsf7Update2_lsfinstall.tar.Z`

---

**TIP:** Do not uncompress and extract the distribution tar files.

---

- ❖ Get a valid license key and create a license file (`license.dat`) in the same directory as the distribution files and `lsf7Update2_lsfinstall.tar.Z`.

---

**CAUTION:** If you do not specify a license file with `LSF_LICENSE`, or `lsfinstall` cannot find a license file in the default location, `lsfinstall` exits.

---

- ❖ Make sure the installation file system containing `LSF_TOP` is writable by the user account that is running `lsfinstall`.

## Running lsfinstall

- 1 Log on as root to the installation file server.
- 2 Edit `lsf7Update2_lsfinstall/install.config` or `lsf7Update2_lsfinstall/slave.config`.

Uncomment the options you want in the template file, and replace the example values with your own settings.

To enable Platform LSF HPC installation, specify `ENABLE_HPC_INST=Y` in `install.config`.

---

**TIP:** The sample values in the `install.config` and `slave.config` template files are examples only. They are *not* default installation values.

---

- 3 Change to `lsf7Update2_lsfinstall/`.
- 4 Run `lsfinstall`:
  - ❖ `# ./lsfinstall -f install.config`
  - OR
  - ❖ `# ./lsfinstall -s -f slave.config`
- 5 Before using your cluster, read the following:
  - ❖ `lsf7Update2_lsfinstall/lsf_getting_started.html` to find out how to set up your LSF hosts, start LSF and test your new cluster.
  - ❖ `lsf7Update2_lsfinstall/lsf_quick_admin.html` to learn more about your new cluster.

## If you install as a non-root user

You can install as a non-root user with some limitations. During installation, `lsfinstall` detects that you are not root. You must choose to configure either a multi-user cluster or a single-user cluster:

- ◆ *Single-user*— Your user account must be primary LSF administrator. You can start LSF daemons, but only your user account can submit jobs to the cluster. Your user account must be able to read the system kernel information, such as `/dev/kmem`.

## Description

- ◆ *Multi-user*—By default, only root can start the LSF daemons. Any user can submit jobs to your cluster. To make the cluster available to other users, you must manually change the ownership and setuid bit for `lsadmin` and `badmin` to root, and the file permission mode to `-rwsr-xr-x (4755)` so that the user ID bit for the owner is setuid.

Use the following commands to set the correct owner, user ID bit, and file permission mode for a multi-user cluster:

```
# chown root lsadmin badmin eauth swtbl_api ntbl_api
# chmod 4755 lsadmin badmin eauth swtbl_api ntbl_api
```

## After installing Platform LSF

- 1 **Optional.** Run `hostsetup` to configure host-based resources and set up automatic LSF startup on your server hosts.

---

**TIP:** For Platform LSF HPC hosts, running `hostsetup` is optional on AIX and Linux. You must run `hostsetup` on SGI IRIX, TRIX, and Altix hosts, and on HP-UX hosts.

---

- a Log on to each server host as root. Start with the master host. If you are not root, you can continue with host setup, but by default, only root can start the LSF daemons.
- b Run `hostsetup` on each server host. For example:

```
# cd /usr/share/lsf/7.0/install
# ./hostsetup --top="/usr/share/lsf" --boot="y"
```

---

**TIP:** For complete `hostsetup` usage, enter `hostsetup -h`.

---

- 2 Log on to the LSF master host as root, and set your LSF environment:

- ◆ For `csh` or `tcsh`:  

```
% source LSF_TOP/conf/cshrc.lsf
```
- ◆ For `sh`, `ksh`, or `bash`:  

```
$ . LSF_TOP/conf/profile.lsf
```

- 3 Run `lsfstartup` to start the cluster.

---

**TIP:** For large cluster, where cluster management software exists, you should use `/etc/init.d/lsf` start instead of `lsfstartup`.

---

- 4 Test your cluster by running some basic commands (e.g., `lsid`, `lshosts`, `bhosts`)

After testing your cluster, be sure all LSF users include `LSF_CONFDIR/cshrc.lsf` or `LSF_CONFDIR/profile.lsf` in their `.cshrc` or `.profile`.

Follow the steps in `lsf7Update2_lsfinstall/lsf_quick_admin.html` for using `LSF_CONFDIR/cshrc.lsf` and `LSF_CONFDIR/profile.lsf` to set up the Platform LSF environment for users.

## hostsetup example

The following example sets up a host to use the cluster installed in `/usr/share/lsf`. It also configures the LSF daemons to start automatically (`--boot="y"`):

```
# hostsetup --top="/usr/share/lsf" --boot="y"
```

## Running host setup remotely (rhostsetup)

Use the `rhostsetup` script to launch `hostsetup` on remote hosts.

`rhostsetup` uses either `ssh` or `rsh`. It is included in the installation script tar file `lsf7Update2_lsfinstall.tar.Z` and is located in the `lsf7Update2_lsfinstall` directory created when you uncompress and extract installation script tar file.

After installation, `rhostsetup` is located in `LSF_TOP/7.0/install/`.

## rhostsetup parameters

Before using `rhostsetup`, you must configure the following parameters at the top of the script:

- ◆ `LSF_RSHCMD`—the remote shell command (e.g. `rsh` or `ssh`) accessing the remote host
- ◆ `LSF_HOSTS`—list of hosts to run `hostsetup` on
- ◆ `LSF_TOPDIR`—sets the `hostsetup --top` option. Specify the full path to the top-level installation directory. `rhostsetup` tries to detect this from `lsf.conf` if it is not defined here.
- ◆ `LSF_BOOT`—sets the `hostsetup --boot` option. Default is no (n).
- ◆ `LSF_QUIET`—sets the `hostsetup --quiet` option. Default is no (n).

## Example rhostsetup configuration

```
LSF_RSHCMD="ssh -n"  
LSF_HOSTS="hostA hostB hostC"  
LSF_TOPDIR="/usr/local/lsf"  
LSF_BOOT=y  
LSF_QUIET=n
```

## Options

**-f *option\_file*** Name of the file containing the installation options. The file can be any name you choose. The name of the default template file for normal installation is `install.config`. To install slave hosts for dynamic host configuration, use the template file `slave.config`.

**-s** Install a dynamic slave host.

Specify installation options in the `slave.config` file.

*Required parameters:*

- ◆ `LSF_SERVER_HOSTS="host_name [host_name ...]"`
- ◆ `LSF_TOP="/path"`
- ◆ `LSF_TARDIR="/path"`

## See Also

*Optional parameters:*

`LSF_LIM_PORT=port_number`

If the master host does not use the default `LSF_LIM_PORT`, you must specify the same `LSF_LIM_PORT` defined in `lsf.conf` on the master host.

`LSF_LOCAL_RESOURCES="resource ..."`

Defines the local resources for a dynamic host.

- ◆ For numeric resources, defined name-value pairs:

`"[resourcemap value*resource_name]"`

- ◆ For Boolean resources, the value will be the resource name in the form:

`"[resource resource_name]"`

For example:

```
LSF_LOCAL_RESOURCES="[hostname hostA] [server 1] [resourcemap
1*verilog] [resource linux]"
```

---

**TIP:** If `LSF_LOCAL_RESOURCES` are already defined in a local `lsf.conf` on the slave host, `lsfinstall` does not add resources you define in `LSF_LOCAL_RESOURCES` in `slave.config`.

---

`lsfinstall` creates a local `lsf.conf` for the slave host, which sets the following parameters:

- ◆ `LSF_CONFDIR="/path"`
- ◆ `LSF_GET_CONF=lim`
- ◆ `LSF_LIM_PORT=port_number`
- ◆ `LSF_LOCAL_RESOURCES="resource ..."`
- ◆ `LSF_SERVER_HOSTS="host_name [host_name ...]"`
- ◆ `LSF_VERSION=7.0`

**-h** Prints command usage and exits.

## See Also

`lsf.conf`, `install.config`, `slave.config`

# lsfmon

installs or uninstalls LSF Monitor

## Synopsis

```
lsfmon -install  
lsfmon -remove
```

## Description

Installs or uninstalls LSF Monitor in an existing cluster.

LSF Monitor runs on Microsoft Windows and allows you to use Windows Performance Monitor to chart information about the LSF cluster.

The LSF Monitor service runs under the account of an LSF cluster administrator.

## Options

- install** Installs LSF Monitor on the host.
- remove** Removes LSF Monitor from the host.

# lsfrestart

restarts LIM, RES, sbatchd and mbatchd on all hosts in the cluster

## Synopsis

```
lsfrestart [-f | -h | -V]
```

## Description

---

**CAUTION:** This command can only be used by root or users listed in `lsf.sudoers`.

---

Restarts LIM, RES, sbatchd and mbatchd, in that order, on all hosts in the local cluster.

By default, prompts for confirmation of the next operation if an error is encountered.

In order to be able to control all daemons in the cluster:

- ◆ The file `/etc/lsf.sudoers` has to be set up properly.
- ◆ You must be able to run the `rsh` or `ssh` command across all LSF hosts without having to enter a password. See your operating system documentation for information about configuring the `rsh` and `ssh` commands.

The shell command specified by `LSF_RSH` in `lsf.conf` is used before `rsh` is tried.

## Options

- f** Force mode. Continues to restart daemons even if an error is encountered.
- h** Prints command usage to `stderr` and exits.
- V** Prints LSF release version to `stderr` and exits.

## See Also

[lsadmin\(8\)](#), [badmin\(8\)](#), [lsfshutdown\(8\)](#), [lsf.sudoers\(5\)](#)

# lsfshutdown

shuts down LIM, RES, sbatchd and mbatchd on all hosts in the cluster

## Synopsis

```
lsfshutdown [-f | -h | -V]
```

## Description

---

**CAUTION:** This command can only be used by root or users listed in `lsf.sudoers`.

---

Shuts down `sbatchd`, `RES`, `LIM`, and `mbatchd`, in that order, on all hosts.

By default, prompts for confirmation of the next operation if an error is encountered.

In order to be able to control all daemons in the cluster:

- ◆ The file `/etc/lsf.sudoers` has to be set up properly.
- ◆ You must be able to run the `rsh` or `ssh` command across all LSF hosts without having to enter a password. See your operating system documentation for information about configuring the `rsh` and `ssh` commands.

The shell command specified by `LSF_RSH` in `lsf.conf` is used before `rsh` is tried.

## Options

- f** Force mode. Continues to shut down daemons even if an error is encountered.
- h** Prints command usage to `stderr` and exits.
- V** Prints LSF release version to `stderr` and exits.

## See Also

[lsadmin\(8\)](#), [badmin\(8\)](#), [lsfrestart\(8\)](#), [lsf.sudoers\(5\)](#)

# lsfstartup

starts LIM, RES, sbatchd, and mbatchd on all hosts in the cluster

## Synopsis

```
lsfstartup [-f ]
```

```
lsfstartup [-h | -V]
```

## Description

---

**CAUTION:** This command can only be used by root or users listed in `lsf.sudoers`.

---

Starts LIM, RES, sbatchd, and mbatchd, in that order, on all hosts.

By default, prompts for confirmation of the next operation if an error is encountered.

If LSF daemons are already running, use `lsfrestart` instead, or use `lsfshutdown` and shut down the running daemons before you use `lsfstartup`.

In order to be able to control all daemons in the cluster:

- ◆ The file `/etc/lsf.sudoers` has to be set up properly.
- ◆ You must be able to run the `rsh` or `ssh` command across all LSF hosts without having to enter a password. See your operating system documentation for information about configuring the `rsh` and `ssh` commands.

The shell command specified by `LSF_RSH` in `lsf.conf` is used before `rsh` is tried.

## Options

- f** Force mode. Continues to start daemons even if an error is encountered.
- h** Prints command usage to `stderr` and exits.
- v** Prints LSF release version to `stderr` and exits.

## See Also

[lsadmin\(8\)](#), [badmin\(8\)](#), [lsfshutdown\(8\)](#), [lsfrestart\(8\)](#), [lsf.sudoers\(5\)](#)

# lsgrun

executes a task on a set of hosts

## Synopsis

```
lsgrun [-i] [-p | -P | -S] [-v]
        -f host_file | -m host_name ... | -n num_hosts [-R "res_req"]
        [command [argument ...]]
```

```
lsgrun [-h | -V]
```

## Description

Executes a task on the specified hosts. `lsgrun` is useful for fast global operations such as starting daemons, replicating files to or from local disks, looking for processes running on all hosts, checking who is logged in on each host, and so on. The hosts can be specified using a host file, a list of host names or by letting the system select the hosts. If `LSB_DISABLE_LIMLOCK_EXCL=y` (to enable preemption of exclusive jobs, for example), you can use `lsgrun` to start a task on hosts that are currently running exclusive jobs.

By default:

- ◆ `lsgrun` is not interactive.
- ◆ The specified task will be executed sequentially on hosts with full pseudo `tty` support.
- ◆ `lsgrun` does not create a pseudo-terminal.
- ◆ LSF uses as many processors as available to run the specified task.
- ◆ The resource requirement for host selection is `r15s:pg`.
- ◆ The prompt `Command>` is displayed to allow users to type in a command (task) terminated by a `CTRL-D` or `EOF`. The command is then executed on the specified hosts.

## Options

- i** Interactive operation mode. You are asked whether the task will be executed on all hosts. If you answer `y`, the task is started on all specified hosts; otherwise, you are asked to specify hosts interactively.
- P** Creates a pseudo-terminal on UNIX hosts. This is necessary to run programs requiring a pseudo-terminal (for example, `vi`).  
This option is not supported on Windows.
- p** Parallel run mode. Executes the task on all hosts simultaneously and without pseudo `tty` support.  
If this option is specified and the `-P` option is specified, the `-P` option is ignored. This option is useful for fast start-up of tasks. However, any output from remote tasks will arrive at the terminal in arbitrary order, depending on task execution speeds on individual hosts.

## Options

- S** Creates a pseudo-terminal with shell mode support on UNIX hosts.  
Shell mode support is required for running interactive shells or applications which redefine the CTRL-C and CTRL-Z keys (such as `jove`).  
This option is not supported on Windows.
  - v** Verbose mode. Displays the name of the host or hosts running the task.
  - f *host\_file*** Either `-f host_file`, `-m host_name` or `-n num_processors` is required.  
Executes the task on all hosts listed in the *host\_file*.  
Specify a file that contains a list of host names. Host names must be separated by white space characters (for example, SPACE, TAB, and NEWLINE).  
This option is exclusive of options `-n`, `-R`, and `-m`.
  - m *host\_name ...*** Either `-f host_file`, `-m host_name` or `-n num_processors` is required.  
Executes the task on all specified hosts.  
Specify hosts on which to execute the task. If multiple host names are specified, the host names must be enclosed by " or ' and separated by white space.  
This option is exclusive of options `-n`, `-R`, and `-f`.
  - n *num\_hosts*** Either `-f host_file`, `-m host_name` or `-n num_hosts` is required.  
Executes the task in a cluster with the required number of available hosts.  
One host may be used to start several tasks if the host is multiprocessor. This option can be used together with option `-R` to select desired hosts.  
This option is exclusive of options `-m` and `-f`.
  - R "*res\_req*"** Executes the task on hosts with the required resource requirements.  
Specify the resource requirement expression for host selection. The resource requirement will be used to choose from all hosts with the same host type as the local host, unless a "`type == value`" exists in `res_req` to specify otherwise.  
This option can be used together with option `-n` to choose a specified number of processors to run the task.  
Exclusive resources need to be explicitly specified within the resource requirement string. For example, you defined a resource called `bigmem` in `lsf.shared` and defined it as an exclusive resource for `hostE` in `lsf.cluster.mycluster`. Use the following command to submit a task to run on `hostE`:  

```
lsgrun -R "bigmem" myjob
```

  
or  

```
lsgrun -R "defined(bigmem)" myjob
```

  
If the `-m` option is specified with a single host name, the `-R` option is ignored.
- command [argument ...]***
- Specify the command to execute. This must be the last argument on the command line.
- h** Prints command usage to `stderr` and exits.
  - V** Prints LSF release version to `stderr` and exits.

## Diagnostics

Exit status is 0 if all commands are executed correctly.

Otherwise, the exit status is the first non-zero status returned by a remotely executed task. `lsgrun` will execute the task on all hosts even if some have non-zero exit status.

Exit status is -10 if a problem is detected in LSF.

## See Also

`lsfintro`, [lsrun](#), [lsplace](#)

# lshosts

displays hosts and their static resource information

## Synopsis

```
lshosts [-w | -l] [-R "res_req"] [host_name | cluster_name] ...
lshosts -s [shared_resource_name ...]
lshosts [-h | -V]
```

## Description

Displays static resource information about hosts.

By default, returns the following information: host name, host type, host model, CPU factor, number of CPUs, total memory, total swap space, whether or not the host is a server host, and static resources. Displays information about all hosts in the cluster. See `lsf.cluster(5)`.

In MultiCluster job forwarding model, the default behavior is to return the following information: host name, host type, host model, CPU factor, number of CPUs, total memory, total swap space, whether or not the host is a server host, and static resources. Displays information about all hosts in the local cluster and for all hosts in equivalent remote clusters that the local cluster sees. See `lsf.cluster(5)`.

In MultiCluster resource leasing model, returns information about hosts in the local cluster.

The `-s` option displays information about the static shared resources and their associated hosts.

## Options

- l** Displays host information in a long multi-line format. In addition to the default fields, displays additional information, including maximum `/tmp` space, the number of local disks, the execution priority for remote jobs, load thresholds, run windows, and the license classes used or needed.
- w** Displays host information in wide format. Fields are displayed without truncation.
- R "res\_req"** Only displays information about the hosts that satisfy the resource requirement expression. For more information about resource requirements, see `lsfintro(1)`. The size of the resource requirement string is limited to 512 bytes. LSF supports ordering of resource requirements on all load indices, including external load indices, either static or dynamic.  
In MultiCluster, only displays information about the hosts in the local cluster that satisfy the resource requirement expression.

**host\_name...|cluster\_name...**

Only displays information about the specified hosts. Do not use quotes when specifying multiple hosts.

For MultiCluster, displays information about hosts in the specified clusters. The names of the hosts belonging to the cluster are displayed instead of the name of the cluster. Do not use quotes when specifying multiple clusters.

**-s** [*shared\_resource\_name ...*]

Displays information about the specified resources. The resources must be static shared resources. If no shared resource is specified, then displays information about all shared resources. Returns the following information: the resource names, the values of the resources, and the resource locations.

**-h** Prints command usage to `stderr` and exits.

**-v** Prints the LSF release version to `stderr` and exits.

## Output

### Host-Based Default

Displays the following fields:

<b>HOST_NAME</b>	The name of the host. This display field is truncated.
<b>type</b>	The host type. This display field is truncated. With MultiCluster, if the host type of a remote cluster's host is not defined in the local cluster, the keyword <code>unknown</code> will be displayed.
<b>model</b>	The host model. This display field is truncated. With MultiCluster, if the host model of a remote cluster's host is not defined in the local cluster, the keyword <code>unknown</code> will be displayed.
<b>cpuf</b>	The relative CPU performance factor. The CPU factor is used to scale the CPU load value so that differences in CPU speeds are considered. The faster the CPU, the larger the CPU factor. The CPU factor of a host with an <code>unknown</code> host type is 1.0.
<b>ncpus</b>	The number of processors on this host. If <code>LSF_ENABLE_DUALCORE=Y</code> in <code>lsf.conf</code> for dual-core CPU hosts, displays the number of cores instead of physical CPUs. If EGO is enabled in the LSF cluster and <code>EGO_DEFINE_NCPUS</code> is specified in <code>lsf.conf</code> or <code>ego.conf</code> , the appropriate value for <code>ncpus</code> is displayed, depending on the value of <code>EGO_DEFINE_NCPUS</code> : <ul style="list-style-type: none"><li>◆ <code>EGO_DEFINE_NCPUS=procs</code>—<code>ncpus=number of processors</code></li><li>◆ <code>EGO_DEFINE_NCPUS=cores</code>—<code>ncpus=number of processors x number of cores</code></li><li>◆ <code>EGO_DEFINE_NCPUS=threads</code>—<code>ncpus=number of processors x number of cores x number of threads</code></li></ul> <code>EGO_DEFINE_NCPUS=cores</code> is the same as setting <code>LSF_ENABLE_DUALCORE=Y</code> .
<b>maxmem</b>	The maximum amount of physical memory available for user processes.

## Output

By default, the amount is displayed in KB. The amount may appear in MB depending on the actual system memory. Use `LSF_UNIT_FOR_LIMITS` in `lsf.conf` to specify a larger unit for the the limit (GB, TB, PB, or EB).

### maxswp

The total available swap space.

By default, the amount is displayed in KB. The amount may appear in MB depending on the actual system swap space. Use `LSF_UNIT_FOR_LIMITS` in `lsf.conf` to specify a larger unit for the the limit (GB, TB, PB, or EB).

### server

Indicates whether the host is a server or client host. “Yes” is displayed for LSF servers. “No” is displayed for LSF clients. “Dyn” is displayed for dynamic hosts.

## RESOURCES

The Boolean resources defined for this host, denoted by resource names, and the values of external numeric and string static resources. See `lsf.cluster(5)`, and `lsf.shared(5)` on how to configure external static resources.

## Host Based -l Option

In addition to the above fields, the `-l` option also displays the following:

### ndisks

The number of local disk drives directly attached to the host.

### maxtmp

The maximum `/tmp` space in MB configured on a host.

### rexpri

UNIX only. The execution priority of remote jobs run by the RES. `rexpri` is a number between -20 and 20, with -20 representing the highest priority and 20 the lowest. The default `rexpri` is 0, which corresponds to the default scheduling priority of 0 on BSD-based UNIX systems and 20 on System V-based systems.

### nprocs

The number of physical processors per CPU configured on a host.

### ncores

The number of cores per processor configured on a host.

### nthreads

The number of threads per core configured on a host.

## RUN\_WINDOWS

The time windows during which LIM considers the host as available to execute remote jobs. These run windows have the same function for LSF hosts as dispatch windows have for LSF hosts. (See `lsf.cluster(5)`.)

## LICENSES\_ENABLED

The licenses that are enabled for each specified host.

If `LSF_ENABLE_DUALCORE=Y` in `lsf.conf` for dual-core CPU hosts, `lshosts -l` also displays if dual-core CPU license is enabled for the hosts and the number of dual-core licenses enabled.

## LICENSE CLASS NEEDED

The required banded license class for each specified host.

If `LSF_ENABLE_DUALCORE=Y` in `lsf.conf` for dual-core CPU hosts, `lshosts -l` also displays if dual-core CPU license is enabled for the hosts and the number of dual-core licenses needed.

## LOAD\_THRESHOLDS

The thresholds for scheduling interactive jobs. If a load index exceeds the load threshold (or falls below the load threshold, for decreasing load indices), the host status is changed to “busy.” If the threshold is displayed as a dash “-”, the value of that load index does not affect the host’s status. See `lsload(1)`.

## Resource-Based -s Option

Displays the static shared resources. Each line gives the value and the associated hosts for the static shared resource. See `lsf.shared(5)`, and `lsf.cluster(5)` on how to configure static shared resources.

The following fields are displayed:

### RESOURCE

The name of the resource.

### VALUE

The value of the static shared resource.

### LOCATION

The hosts that are associated with the static shared resource.

## Files

Reads `lsf.cluster.cluster_name`.

## See Also

`lsfintro` `ls_info`, `ls_policy`, `ls_gethostinfo`, `lsf.cluster`, `lsf.shared`

lsid

# lsid

displays the current LSF version number, the cluster name, and the master host name

## Synopsis

```
lsid [-h | -V]
```

## Description

Displays the current LSF version number, the cluster name, and the master host name.

The master host is dynamically selected from all hosts in the cluster.

In MultiCluster, the master host is dynamically selected from all hosts in the local cluster.

## Options

- h** Prints command usage to `stderr` and exits.
- v** Prints LSF release version to `stderr` and exits.

## Files

The host names and cluster names are defined in `lsf.cluster.cluster_name` and `lsf.shared`, respectively.

## See Also

[ls\\_getclustername\(3\)](#), [ls\\_getmastername\(3\)](#), [lsinfo\(1\)](#)

# lshinfo

displays load sharing configuration information

## Synopsis

```
lshinfo [-l] [-m | -M] [-r] [-t] [resource_name ...]
```

```
lshinfo [-h | -V]
```

## Description

By default, displays all load sharing configuration information including resource names and their meanings, host types and models, and associated CPU factors known to the system.

By default, displays information about all resources. Resource information includes resource name, resource type, description, and the default sort order for the resource.

You can use resource names in task placement requests.

Use this command with options to selectively view configured resources, host types, and host models.

## Options

- l** Displays resource information in a long multi-line format. Additional parameters are displayed including whether a resource is built-in or configured, and whether the resource value changes dynamically or is static. If the resource value changes dynamically then the interval indicates how often it is evaluated.
- M** Displays information about all host models in the file `lsf.shared`.
- m** Displays only information about host models that exist in the cluster.
- r** Displays only information about configured resources.
- t** Displays only information about configured host types. See `lslload(1)` and `lshosts(1)`.
- resource\_name* ...** Displays only information about the specified resources.
- h** Prints command usage to `stderr` and exits.
- V** Prints LSF release version to `stderr` and exits.

## Output

### -l option

The `-l` option displays all information available about load indices.

### TYPE

Indicates whether the resource is numeric, string, or Boolean.

### ORDER

- ◆ `Inc`—If the numeric value of the load index increases as the load it measures increases, such as CPU utilization(`ut`).

## See Also

- ◆ Dec—If the numeric value decreases as the load increases.
- ◆ N/A—If the resource is not numeric.

## INTERVAL

The number of seconds between updates of that index. Load indices are updated every INTERVAL seconds. A value of 0 means the value never changes.

## BUILTIN

If BUILTIN is Yes, the resource name is defined internally by LIM. If BUILTIN is No, the resource name is site-specific defined externally by the LSF administrator.

## DYNAMIC

If DYNAMIC is Yes the resource is a load index that changes over time. If DYNAMIC is No the resource represents information that is fixed such as the total swap space on a host. Resources are Static or Boolean.

## RELEASE

Applies to numeric shared resources only, such as floating licenses. Indicates whether LSF releases the resource when a job using the resource is suspended. When a job using a shared resource is suspended, the resource is held or released by the job depending on the configuration of the RELEASE parameter in `lsf.shared`.

No indicates the resource is held. Yes indicates the resource is released.

## See Also

`lsfintro(1)`, `lshosts(1)`, `lsload(1)`, `lsf.shared(5)`, `ls_info(3)`, `ls_policy(3)`

# lslload

displays load information for hosts

## Synopsis

```
lslload [-l] [-N | -E] [-I load_index[:load_index] ...]
        [-n num_hosts] [-R res_req] [host_name ... | cluster_name ...]
lslload -s [resource_name ...]
lslload [-h | -V]
```

## Description

Displays load information for hosts. Load information can be displayed on a per-host basis, or on a per-resource basis.

By default, displays load information for all hosts in the local cluster, per host.

With MultiCluster, also displays load information for all hosts in equivalent clusters (see `lsf.cluster(5)`).

By default, displays raw load indices.

By default, load information for resources is displayed according to CPU and paging load.

## Options

- l** Long format. Displays load information without truncation along with additional fields for I/O and external load indices.  
This option overrides the index names specified with the `-I` option.
- N** Displays normalized CPU run queue length load indices (see `lsfinintro(1)`).
- E** Displays effective CPU run queue length load indices (see `lsfinintro(1)`). Options `-N` and `-E` are mutually exclusive.
- w** Displays load information in wide format. Fields are displayed without truncation.

### **-I *load\_index[:load\_index]* ...**

Displays only the specified load indices. Separate multiple index names with colons (for example, `rlm:pg:ut`).

Specify any built-in load index. Specify external load indices only for host-based resources that are numeric and dynamic (you cannot specify external load indices for shared, string or Boolean resources).

- n *num\_hosts*** Displays only load information for the requested number of hosts. Information for up to `num_hosts` hosts that best satisfy the resource requirements is displayed.

- R *res\_req*** Displays only load information for hosts that satisfy the specified resource requirements. See `lsinfo(1)` for a list of built-in resource names.  
Load information for the hosts is sorted according to load on the specified resources.

## Output

If `res_req` contains special resource names, only load information for hosts that provide these resources is displayed (see `lshosts(1)` to find out what resources are available on each host).

If one or more host names are specified, only load information about the hosts that satisfy the resource requirements is displayed.

With MultiCluster, when a cluster name is specified, displays load information of hosts in the specified cluster that satisfy the resource requirements.

### **host\_name ... | cluster\_name ...**

Displays only load information for the specified hosts.

With MultiCluster, displays only load information for hosts in the specified clusters.

**-s [resource\_name ...]** Displays information about all dynamic shared resources configured in the cluster, or about the specified resources only. Specify dynamic shared resources.

**-h** Prints command usage to `stderr` and exits.

**-v** Prints LSF release version to `stderr` and exits.

## Output

### Host-Based Output (default output)

Built-in load indices include `r15s`, `r1m`, `r15m`, `ut`, `pg`, `io`, `ls`, `it`, `swp`, `mem` and `tmp`. External load indices are configured in the file `lsf.cluster.cluster_name` (see `lsf.cluster(5)`). The selection and order sections of `res_req` control for which hosts are displayed and how the information is ordered (see `lsfintro(1)`).

The display includes the following fields:

#### HOST\_NAME

Standard host name used by LSF, typically an Internet domain name with two components.

#### status

Status of the host. A minus sign (-) may precede the status, indicating that RES is not running on the host.

Possible statuses are:

##### **ok**

The host is in normal load sharing state and can accept remote jobs. The `ok` status indicates that the Load Information Manager (LIM) is unlocked and that both LIM and the Remote Execution Server (RES) are running.

---

#### **Author Comment:**

#### **Comment by K. Cann. importance.**

*I have purposely avoided saying that the status shows `ok` when a host is running an exclusive job with preemption of exclusive jobs enabled. It seems counterintuitive that the host would show "`ok`" if it is not actually available to run jobs because an exclusive job is running.*

---

##### **-ok**

The (LIM) on the host is running but RES is unreachable.

**busy**

The host is overloaded because some load indices exceed configured thresholds. Load index values that caused the host to be busy are preceded by an asterisk (\*).

**lockW**

The host is locked by its run window. Run windows for a host are specified in the configuration file (see `lsf.conf(5)`) and can be displayed by `lshosts`. A locked host will not accept load shared jobs from other hosts.

**lockU**

The host is locked by the LSF administrator or `root`.

**unavail**

The host is down or the LIM on the host is not running.

**unlicensed**

The host does not have a valid LSF license.

<code>r15s</code>	The 15-second exponentially averaged CPU run queue length.
<code>r1m</code>	The 1-minute exponentially averaged CPU run queue length.
<code>r15m</code>	The 15-minute exponentially averaged CPU run queue length.
<code>ut</code>	The CPU utilization exponentially averaged over the last minute, between 0 and 1.
<code>pg</code>	The memory paging rate exponentially averaged over the last minute, in pages per second.
<code>ls</code>	The number of current login users.
<code>it</code>	On UNIX, the idle time of the host (keyboard not touched on all logged in sessions), in minutes. On Windows, the <code>it</code> index is based on the time a screen saver has been active on a particular host.
<code>tmp</code>	The amount of free space in <code>/tmp</code> , in MB.
<code>swp</code>	The amount of available swap space. By default, the amount is displayed in KB. The amount may appear in MB depending on the actual system swap space. Use <code>LSF_UNIT_FOR_LIMITS</code> in <code>lsf.conf</code> to specify a larger unit for the the limit (GB, TB, PB, or EB).
<code>mem</code>	The amount of available RAM. By default, the amount is displayed in KB. The amount may appear in MB depending on the actual system memory. Use <code>LSF_UNIT_FOR_LIMITS</code> in <code>lsf.conf</code> to specify a larger unit for the the limit (GB, TB, PB, or EB).
<code>io</code>	By default, <code>io</code> is not shown. If <code>-l</code> is specified, shows the disk I/O rate exponentially averaged over the last minute, in KB per second.

## Examples

### *external\_index*

By default, external load indices are not shown.

If `-l` is specified, shows indices for all dynamic custom resources available on the host, including shared, string and Boolean resources.

If `-l load_index` is specified, only shows indices for specified non-shared (host-based) dynamic numeric custom resources.

## Resource-Based Output (`lsload -s`)

Displays information about dynamic shared resources. Each line gives the value and the associated hosts for an instance of the resource. See `lim(8)`, and `lsf.cluster(5)` for information on configuring dynamic shared resources.

The displayed information consists of the following fields:

### RESOURCE

Name of the resource.

### VALUE

Value for an instance of the resource.

### LOCATION

Hosts associated with the instance of the resource.

## Examples

```
lsload -R "select[r1m<=0.5 && swp>=20 && type==ALPHA]"
```

OR, in restricted format:

```
lsload -R r1m=0.5:swp=20:type=ALPHA
```

Displays the load of ALPHA hosts with at least 20 MB of swap space, and a 1-minute run queue length less than 0.5.

```
lsload -R "select[(1-swp/maxswp)<0.75] order[pg]"
```

Displays the load of the hosts whose swap space utilization is less than 75%. The resulting hosts are ordered by paging rate.

```
lsload -I r1m:ut:io:pg
```

Displays the 1-minute CPU raw run queue length, the CPU utilization, the disk I/O and paging rates for all hosts in the cluster.

```
lsload -E
```

Displays the load of all hosts, ordered by `r15s:pg`, with the CPU run queue lengths being the effective run queue lengths (see `lsfintro(1)`).

```
lsload -s verilog_license
```

Displays the value and location of all the `verilog_license` dynamic shared resource instances.

## Diagnostics

Exit status is `-10` for LSF problems or a bad resource names.

Exit status is `-1` if a bad parameter is specified, otherwise `lsload` returns `0`.

## See Also

`lsfintro(1)`, `lim(8)`, `lsf.cluster(5)`, `lsplace(1)`, `lshosts(1)`, `lsinfo(1)`, `lslockhost(8)`, `ls_load(3)`

# lsloadadj

adjusts load indices on hosts

## Synopsis

```
lsloadadj [-R res_req] [host_name[:num_task]] ...]
```

```
lsloadadj [-h | -V]
```

## Description

Adjusts load indices on hosts. This is useful if a task placement decision is made outside LIM by another application.

By default, assumes tasks are CPU-intensive and memory-intensive. This means the CPU and memory load indices are adjusted to a higher number than other load indices.

By default, adjusts load indices on the local host, the host from which the command was submitted.

By default, starts 1 task.

Upon receiving a load adjustment request, LIM temporarily increases the load on hosts according to resource requirements. This helps LIM avoid sending too many jobs to the same host in quick succession. The adjusted load decays over time before the real load produced by the dispatched task is reflected in LIM's load information.

`lsloadadj` adjusts all indices except for `ls` (login sessions), `it` (idle time), `r15m` (15-minute run queue length) and external load indices. Other load indices can only be adjusted beyond specific maximum values.

- ◆ `tmp` is -0.5
- ◆ `swp` is -1.5
- ◆ `mem` is -1.0
- ◆ `r1m` is 0.4
- ◆ `ut` is 15%

## Options

**-R *res\_req*** Specify resource requirements for tasks. Only the resource usage section of the resource requirement string is considered (see `lsfintr(1)`). This is used by LIM to determine by how much individual load indices are to be adjusted.

For example, if a task is swap-space-intensive, load adjustment on the `swp` load index is higher; other indices are increased only slightly.

***host\_name[:num\_task]* ...**

Specify a list of hosts for which load is to be adjusted. `num_task` indicates the number of tasks to be started on the host.

- h** Prints command usage to `stderr` and exits.
- V** Prints LSF release version to `stderr` and exits.

Examples

## Examples

```
lslloadadj -R "rusage[swp=20:mem=10]"
```

Adjusts the load indices `swp` and `mem` on the host from which the command was submitted.

## Diagnostics

Returns -1 if a bad parameter is specified; otherwise returns 0.

## See Also

[lsinfo\(1\)](#), [lsplace\(1\)](#), [lsload\(1\)](#), [ls\\_loadadj\(3\)](#)

# lslogin

remotely logs in to a lightly loaded host

## Synopsis

```
lslogin [-v] [-m "host_name ..." | -m "cluster_name ..."]  
        [-R "res_req"] [rlogin_options]  
lslogin [-h | -V]
```

## Description

Remotely logs in to a lightly loaded host.

By default, `lslogin` selects the least loaded host, with few users logged in, and remotely logs in to that host using the UNIX `rlogin` command.

In a MultiCluster environment, the default is to select the least loaded host in the local cluster.

## Options

**-v** Displays the name of the host to which `lslogin` remotely logs you in.

**-m "host\_name ..." | -m "cluster\_name ..."**

Remotely logs in to the specified host.

With MultiCluster job forwarding, when a cluster name is specified, remotely logs in to the least loaded host in the specified cluster, if the remote cluster accepts interactive jobs from the local cluster (see `lsf.cluster(5)`).

**-R "res\_req"** Remotely logs in to a host that meets the specified resource requirement. The resource requirement expression restricts the set of candidate hosts and determines the host selection policy.

For a complete explanation of resource requirement expressions, see `lsfintro(1)`. To find out what resources are configured in your system, use `lsinfo(1)` and `lshosts(1)`.

**rlogin\_options** Specify remote login options passed to the `rlogin` command.

If remote execution fails, `lslogin` will log in locally only if the local host also satisfies required resources; otherwise, log in will fail.

**-h** Prints command usage to `stderr` and exits.

**-V** Prints LSF release version to `stderr` and exits.

## Example

```
lslogin -R "select[it>1 && bsd]"
```

Remotely logs in to a host that has been idle for at least 1 minute, that runs BSD UNIX, and is lightly loaded both in CPU resources and the number of users logged in.

Diagnostics

## Diagnostics

Because `lslogin` passes all unrecognized arguments to `rlogin`, incorrect options usually cause the `rlogin` usage message to be displayed rather than the `lslogin` usage message.

## See Also

`lsfintro(1)`, `ls_placereq(3)`, `rlogin(1)`

# lsltasks

displays or updates a local task list

## Synopsis

```
lsltasks [+ task_name ... | - task_name ...]
```

```
lsltasks [-h | -V]
```

## Description

Displays or updates a user local task list in `$HOME/.lsltask`.

When no options are specified, displays tasks listed in the system task file `lsf.task` and the user task file `.lsltask`.

If there is a conflict between the system task file `lsf.task` and the user task file (`.lsltask`), the user task file overrides the system task file.

Tasks in the local task list are not eligible for remote execution, either because they are trivial tasks or because they need resources on the local host.

## Options

- + *task\_name*** If + is specified and the specified task names are not already in the user task file (`.lsltask`), adds the task names to the file with a plus sign (+) preceding them.  
If any of the task names are already in the `.lsltask` file, the actual action depends on the entry in the file. If the entry starts with a + or nothing, replaces the entry with the specified content; if the entry starts with a minus sign (-), deletes the entry from the `.lsltask` file.
- *task\_name*** If - is specified and specified task names are not already in the user `.lsltask` file, adds the task names to the file with a - preceding the task name.  
If any of the task names are already in the `.lsltask` file, the actual action depends on the entry in the file. If the entry starts with a -, no operation is done; if the entry starts with a +, deletes the entry from the `.lsltask` file.
- h** Prints command usage to `stderr` and exits.
- V** Prints LSF release version to `stderr` and exits.

## Examples

```
lsltasks + foo
```

Adds the command `foo` to the local task list.

## Files

Reads the system task file `lsf.task`, and the user `.lsltask` file. See `lsf.task(5)` for more details.

## See Also

The system and user task files contain two sections, one for the remote task list, the other for the local task list. The local tasks section starts with `Begin LocalTasks` and ends with `End LocalTasks`. Each line in the section is an entry consisting of a task name.

A plus sign (+) or a minus sign (-) can optionally precede each entry. If no + or - is specified, then + is assumed.

## See Also

[lsfintro\(1\)](#), [lselectible\(1\)](#), [ls\\_task\(3\)](#), [lsrtasks\(1\)](#), [lsf.task\(5\)](#), [ls\\_eligible\(3\)](#)

# lsmom

displays load information for LSF hosts and periodically updates the display

## Synopsis

```
lsmom [-N | -E] [-n num_hosts] [-R res_req] [-I index_list]
      [-i interval] [-L file_name] [host_name ...]

lsmom [-h | -V]
```

## Description

`lsmom` is a full-screen LSF monitoring utility that displays and updates load information for hosts in a cluster.

By default, displays load information for all hosts in the cluster, up to the number of lines that will fit on-screen.

By default, displays raw load indices.

By default, load information is sorted according to CPU and paging load.

By default, load information is updated every 10 seconds.

## Options

- N** Displays normalized CPU run queue length load indices (see `lsfintro(1)`).
- E** Displays effective CPU run queue length load indices (see `lsfintro(1)`). Options **-N** and **-E** are mutually exclusive.
- n num\_hosts** Displays only load information for the requested number of hosts. Information for up to `num_hosts` hosts that best satisfy resource requirements is displayed.
- R res\_req** Displays only load information for hosts that satisfy the specified resource requirements. See `lsinfo(1)` for a list of built-in resource names.  
Load information for the hosts is sorted according to load on the specified resources.  
If `res_req` contains special resource names, only load information for hosts that provide these resources is displayed (see `lshosts(1)` to find out what resources are available on each host).  
If one or more host names are specified, only load information for the hosts that satisfy the resource requirements is displayed.
- I index\_list** Displays only load information for the specified load indices. Load index names must be separated by a colon (for example, `r1m:pg:ut`).  
If the index list `index_list` is too long to fit in the screen of the user who invoked the command, the output is truncated. For example, if the invoker's screen is 80 characters wide, then up to 10 load indices are displayed.
- i interval** Sets how often load information is updated on-screen, in seconds.
- L file\_name** Saves load information in the specified file while it is displayed on-screen.

## Usage

If you do not want load information to be displayed on your screen at the same time, use `lsmon -L file_name < /dev/null`. The format of the file is described in `lim.acct(5)`.

**host\_name ...** Displays only load information for the specified hosts.

**-h** Prints command usage to `stderr` and exits.

**-v** Prints LSF release version to `stderr` and exits.

## Usage

You can use the following commands while `lsmon` is running:

[**^L** | **i** | **n** | **N** | **E** | **R** | **q**]

**^L** Refreshes the screen.

**i** Prompts you to input a new update interval.

**n** Prompts you to input a new number of hosts to display.

**N** Toggles between displaying raw CPU run queue length load indices and normalized CPU run queue length load indices.

**E** Toggles between displaying raw CPU run queue length load indices and effective CPU run queue length load indices.

**R** Prompts you to input new resource requirements.

**q** Quits `lsmon`.

## Output

The following fields are displayed by default.

### HOST\_NAME

Name of specified hosts for which load information is displayed, or if resource requirements were specified, name of hosts that satisfied the specified resource requirement and for which load information is displayed.

### status

Status of the host. A minus sign (-) may precede the status, indicating that the Remote Execution Server (RES) on the host is not running.

Possible statuses are:

#### **ok**

The host is in normal load sharing state and can accept remote jobs.

#### **busy**

The host is overloaded because some load indices exceed configured thresholds. Load index values that caused the host to be busy are preceded by an asterisk (\*). Built-in load indices include `r15s`, `r1m`, `r15m`, `ut`, `pg`, `io`, `ls`, `it`, `swp`, `mem` and `tmp` (see below). External load indices are configured in the file `lsf.cluster.cluster_name` (see `lsf.cluster(5)`).

#### **lockW**

The host is locked by its run window. Run windows for a host are specified in the configuration file (see `lsf.conf(5)`) and can be displayed by `lshosts`. A locked host will not accept load shared jobs from other hosts.

**lockU**

The host is locked by the LSF administrator or `root`.

**unavail**

The host is down or the Load Information Manager (LIM) on the host is not running.

**unlicensed**

The host does not have a valid LSF license.

**r15s**

The 15-second exponentially averaged CPU run queue length.

**r1m**

The 1-minute exponentially averaged CPU run queue length.

**r15m**

The 15-minute exponentially averaged CPU run queue length.

**ut**

The CPU utilization exponentially averaged over the last minute, between 0 and 1.

**pg**

The memory paging rate exponentially averaged over the last minute, in pages per second.

**ls**

The number of current login users.

**it**

On UNIX, the idle time of the host (keyboard not touched on all logged in sessions), in minutes.

On Windows, the `it` index is based on the time a screen saver has been active on a particular host.

**tmp**

The amount of free space in `/tmp`, in megabytes.

**swp**

The amount of currently available swap space, in megabytes.

**mem**

The amount of currently available memory, in megabytes.

## Diagnostics

Specifying an incorrect resource requirement string while `lsmon` is running (via the `R` option) causes `lsmon` to exit with an appropriate error message.

`lsmon` exits if it does not receive a reply from LIM within the update interval.

## See Also

`lsfintro(1)`, `lshosts(1)`, `lsinfo(1)`, `lsload(1)`, `lslockhost(8)`, `lim.acct(5)`,  
`ls_load(3)`

# lspasswd

registers user passwords in LSF on Windows

## Synopsis

```
lspasswd [-u user_name] [-p password]  
lspasswd [-r] [-u user_name]  
lspasswd [-c] [-u user_name] [-p password]  
lspasswd [-h | -V]
```

## Description

Registers user passwords in LSF on Windows. Passwords must be longer than 3 characters and 31 characters or less.

By default, if no options are specified, the password applies to the user who issued the command.

Users must update the password maintained by LSF if they change their Windows user account password.

Passwords are Windows user account passwords and are saved in the LSF database. LSF uses the passwords to start jobs on behalf of the user.

`lspasswd` communicates with LSF services to store the password. The password is stored in encrypted format and the password database is protected by file access permissions. The password remains encrypted as it travels through the network.

The `-p` option allows scripts to use `lspasswd`. You should not use this option directly on the command line because the password is entered in full view on the command line. Only error messages are displayed when using the `-p` option.

## Options

**-c -u *user\_name* -p *password***

Check that the password is valid for the specified user.

**-r -u *user\_name***

Remove the user entry from the password database.

**-u *user\_name* -p *password***

Specify the user and password for the user whose password you want to register or change. Include the domain name in uppercase letters (*DOMAIN\_NAME\user\_name*).

**-h** Prints command usage to `stderr` and exits.

**-V** Prints LSF release version to `stderr` and exits.

## Limitations

You must run `lspasswd` from an LSF Windows host.

# lsplace

displays hosts available to execute tasks

## Synopsis

```
lsplace [-L] [-n minimum | -n 0] [-R res_req] [-w maximum | -w 0]
        [host_name ...]
lsplace [-h | -V]
```

## Description

Displays hosts available for the execution of tasks, and temporarily increases the load on these hosts (to avoid sending too many jobs to the same host in quick succession). The inflated load will decay slowly over time before the real load produced by the dispatched task is reflected in the LIM's load information. Host names may be duplicated for multiprocessor hosts, to indicate that multiple tasks can be placed on a single host.

By default, displays only one host name.

By default, uses LSF default resource requirements.

## Options

- L** Attempts to place tasks on as few hosts as possible. This is useful for distributed parallel applications in order to minimize communication costs between tasks.
- n *minimum* | -n 0** Displays at least the specified number of hosts. Specify 0 to display as many hosts as possible.  
Prints `Not enough host(s) currently eligible` and exits with status 1 if the required number of hosts holding the required resources cannot be found.
- R *res\_req*** Displays only hosts with the specified resource requirements.
- w *maximum* | -w 0** Displays no more than the specified number of hosts. Specify 0 to display as many hosts as possible.
- host\_name* ...** Displays only hosts that are among the specified hosts.
- h** Prints command usage to `stderr` and exits.
- V** Prints LSF release version to `stderr` and exits.

## Examples

`lsplace` is mostly used in backquotes to pick out a host name which is then passed to other commands. The following example issues a command to display a lightly loaded HPPA-RISC host for your program to run on:

```
lsrun -m `lsplace -R hppa` myprogram
```

In order for a job to land on a host with an exclusive resource, you need to explicitly specify that resource for the resource requirements. The following example issues a command to display the host with the `bigmem` exclusive resource for your program to run on:

```
lshrun -m 'lshplace -R "bigmem"' myprogram
```

The `-w` and `-n` options can be combined to specify the upper and lower bounds in processors to be returned, respectively. For example, the command

```
lshplace -n 3 -v 5
```

returns at least 3 and not more than 5 host names.

## Diagnostics

`lshplace` returns 1 if insufficient hosts are available. The exit status is -10 if a problem is detected in LSF, -1 for other errors, otherwise 0.

## See Also

[lsinfo\(1\)](#), [ls\\_placereq\(3\)](#), [lsload\(1\)](#), [lshrun\(1\)](#)

# lsrcp

remotely copies files using LSF

## Synopsis

```
lsrcp [-a] source_file target_file
```

```
lsrcp [-h | -V]
```

## Description

Remotely copies files using LSF.

`lsrcp` is an LSF-enabled remote copy program that transfers a single file between hosts in an LSF cluster. `lsrcp` uses RES on an LSF host to transfer files. If LSF is not installed on a host or if RES is not running then `lsrcp` uses `rcp` to copy the file.

To use `lsrcp`, you must have read access to the file being copied.

Both the source and target file must be owned by the user who issues the command.

`lsrcp` uses `rcp` to copy a source file to a target file owned by another user. See `rcp(1)` and LIMITATIONS below for details.

## Options

**-a** Appends *source\_file* to *target\_file*.

***source\_file target\_file*** Specify an existing file on a local or remote host that you want to copy, and a file to which you want to copy the source file.

File format is as follows:

```
[[user_name@][host_name]:][path/]file_name
```

***user\_name***

Login name to be used for accessing files on the remote host. If *user\_name* is not specified, the name of the user who issued the command is used.

***host\_name***

Name of the remote host on which the file resides. If *host\_name* is not specified, the local host, the host from which the command was issued, is used.

***path***

Absolute path name or a path name relative to the login directory of the user. Shell file name expansion is not supported on either the local or remote hosts. Only single files can be copied from one host to another.

Use "\" to transfer files from a Windows host to another Windows host. For example:

```
c:\share>lsrcp file1 hostA:c:\temp\file2
```

Use "/" to transfer files from a UNIX host to a UNIX host. For example:

```
lsrcp file1 hostD:/home/usr2/test/file2
```

Always use "/" to transfer files from a UNIX host to a Windows host, or from a Windows host to a UNIX host. This is because the operating system interprets "\" and `lsrcp` will open the wrong files.

For example, to transfer a file from UNIX to a Windows host:

```
lsrcp file1 hostA:c:/temp/file2
```

To transfer a file from Windows to a UNIX host:

```
c:\share>lsrcp file1 hostD:/home/usr2/test/file2
```

**file\_name**

Name of source file. File name expansion is not supported.

- h Prints command usage to `stderr` and exits.
- v Prints LSF release version to `stderr` and exits.

## Examples

```
lsrcp myfile @hostC:/home/usr/dir1/otherfile
```

Copies file `myfile` from the local host to file `otherfile` on `hostC`.

```
lsrcp user1@hostA:/home/myfile user1@hostB:otherfile
```

Copies the file `myfile` from `hostA` to file `otherfile` on `hostB`.

```
lsrcp -a user1@hostD:/home/myfile /dir1/otherfile
```

Appends the file `myfile` on `hostD` to the file `otherfile` on the local host.

```
lsrcp /tmp/myfile user1@hostF:~/otherfile
```

Copies the file `myfile` from the local host to file `otherfile` on `hostF` in `user1`'s home directory.

## Diagnostics

`lsrcp` attempts to copy `source_file` to `target_file` using `RES`. If `RES` is down or fails to copy the `source_file`, `lsrcp` will use either `rsh` or the shell command specified by `LSF_RSH` in `lsf.conf` when the `-a` option is specified. When `-a` is not specified, `lsrcp` will use `rcp`.

## Limitations

File transfer using `lsrcp` is not supported in the following contexts:

- ◆ If LSF account mapping is used; `lsrcp` fails when running under a different user account
- ◆ On LSF client hosts. LSF client hosts do not run `RES`, so `lsrcp` cannot contact `RES` on the submission host
- ◆ Third party copies. `lsrcp` does not support third party copies, when neither source nor target file are on the local host. In such a case `rcp` or `rsh` (or the shell command specified by `LSF_RSH` in `lsf.conf`) will be used. If the `target_file` exists, `lsrcp` preserves the modes; otherwise, `lsrcp` uses the `source_file` modes modified with the `umask` (see `umask(2)`) of the source host.

You can do the following:

## See Also

- ◆ **rcp on UNIX.** If `lsrcp` cannot contact RES on the submission host, it attempts to use `rcp` to copy the file. You must set up the `/etc/hosts.equiv` or `HOME/.rhosts` file in order to use `rcp`. See the `rcp(1)`, `rsh(1)`, `ssh(1)` manual pages for more information on using the `rcp`, `rsh`, and `ssh` commands.
- ◆ You can replace `lsrcp` with your own file transfer mechanism as long as it supports the same syntax as `lsrcp`. This might be done to take advantage of a faster interconnection network, or to overcome limitations with the existing `lsrcp`. `sbatchd` looks for the `lsrcp` executable in the `LSF_BINDIR` directory.

## See Also

`rsh`, `rcp`, `lsfintro`, `res`

# lsrtasks

displays or updates a remote task list

## Synopsis

```
lsrtasks [+ task_name[/res_req] ... | - task_name[/res_req] ...]
```

```
lsrtasks [-h | -V]
```

## Description

Displays or updates a user's remote task list in `$HOME/.lsftask`.

When no options are specified, displays tasks listed in the system task file `lsf.task` and the user's task file (`.lsftask`).

If there is a conflict between the system task file `lsf.task` and the user task file, the user task file overrides the system task file.

Tasks in the remote task list are eligible for remote execution. You can associate resource requirements with each task name. Eligibility of tasks not specified in a task list for remote execution depends on the operation mode: local or remote. In local mode, tasks are not eligible for remote execution; in remote mode, tasks are eligible. You can specify the operation mode when deciding the eligibility of a task (see `lselectible(1)`, and `ls_eligible(3)`).

## Options

**+ task\_name[/res\_req] ...**

If plus sign (+) is specified and the specified task names are not already in the user task file (`.lsftask`), adds the task names to the file with a + sign preceding them.

If any of the task names are already in the `.lsftask` file, the actual action depends on the entry in the file. If the entry starts with a + or nothing, replaces the entry with the specified content; if the entry starts with a minus sign (-), deletes the entry from the `.lsftask` file.

Remote tasks can have a resource requirement expression associated with them, separated by a backslash (/). See `ls_task(3)`.

**- task\_name[/res\_req] ...**

If - is specified and specified task names are not already in the user task file (`.lsftask`), adds the task names to the file with a - preceding the task name.

If any of the task names are already in the `.lsftask` file, the actual action depends on the entry in the file. If the entry starts with a -, no operation is done; if the entry starts with a +, deletes the entry from the `.lsftask` file.

Remote tasks can have a resource requirement expression associated with them, separated by a backslash /. See `ls_task(3)`.

**-h**

Prints command usage to `stderr` and exits.

**-V**

Prints LSF release version to `stderr` and exits.

## Examples

```
% lsrtasks + task1 task2/"select[cpu && mem]" - task3
```

or in restricted form:

```
% lsrtasks + task1 task2/cpu:mem - task3
```

Adds the command `task1` to the remote task list with no resource requirements, adds `task2` with the resource requirement `cpu:mem`, and removes `task3` from the remote task list.

```
% lsrtasks + myjob/swap>=100 && cpu
```

Adds `myjob` to the remote tasks list with its resource requirements.

Running `lsrtasks` with no arguments displays the resource requirements of tasks in the remote list, separated from the task name by a slash (/):

```
% lsrtasks
cc/cpu          cfd3d/type == SG1 && cpu  compressdir/cpu:mem
f77/cpu         verilog/cpu && cadence   compress/cpu
dsim/type == any hspice/cpu && cadence    nas/swp > 200 && cpu
compress/-:cpu:mem epi/hpux11 sparc        regression/cpu
cc/type == local synopsys/swp >150 && cpu
```

## Files

Reads the system task file `lsf.task`, and the user task file (`.lsftask`). See `lsf.task(5)` for more details.

The system and user task files contain two sections, one for the remote task list, the other for the local task list. The remote tasks section starts with `Begin RemoteTasks` and ends with `End RemoteTasks`. Each line in the section is an entry consisting of a task name.

A plus sign `+` or a minus sign `-` can optionally precede each entry. If no `+` or `-` is specified, then `+` is assumed.

## See Also

`lsfintro(1)`, [lselect\(1\)](#), `ls_task(3)`, [lsrtasks\(1\)](#), `lsf.task(5)`, `ls_eligible(3)`

# lshost

runs an interactive task through LSF

## Synopsis

```
lshost [-l] [-L] [-P] [-S] [-v] [-m "host_name  
... " | -m "cluster_name ..."] [-R "res_req"] command [argument  
...]  
lshost [-h | -V]
```

## Description

Submits a task to LSF for execution.

With MultiCluster job forwarding model, the default is to run the task on a host in the local cluster.

By default, `lshost` first tries to obtain resource requirement information from the remote task list to find an eligible host. (See `lselectible(1)` and `ls_task(3)`.) Otherwise, `lshost` runs the task on a host that is of the same host type (or architecture) as the submission host. If several hosts of the same architecture are available, the host with the lowest CPU and memory load is selected.

By default, if execution fails and the local host satisfies resource requirements, LSF runs the task locally.

By default, `lshost` does not create a pseudo-terminal when running the task.

## Options

- l** If execution on another host fails, runs the task locally.
- L** Forces `lshost` to go through RES to execute a task. By default, `lshost` will not use RES if the task is going to run on the current host.
- P** Creates a pseudo-terminal when starting the task on UNIX hosts. This is necessary in order to run programs that require a pseudo-terminal (for example, `vi`). This option is not supported on Windows.
- S** Creates a pseudo-terminal with shell mode support when starting the task on a UNIX host. Shell mode support is required for running interactive shells or applications which redefine the `CTRL-C` and `CTRL-Z` keys (for example, `jobs`). This option is not supported on Windows.
- v** Displays the name of the host running the task.

**-m "host\_name ..."** | **-m "cluster\_name ..."**

The execution host must be one of the specified hosts. If a single host is specified, all resource requirements are ignored.

If multiple hosts are specified and you do not use the `-R` option, the execution host must satisfy the resource requirements in the remote task list (see `lsrtasks(1)`). If none of the specified hosts satisfy the resource requirements, the task will not run.

## Usage

With MultiCluster job forwarding model, the execution host can be a host in one of the specified clusters, if the remote cluster accepts tasks from the local cluster. (See `RemoteClusters` section in `lsf.cluster(5)`.)

- R "res\_req"** Runs the task on a host that meets the specified resource requirement. The size of the resource requirement string is limited to 512 bytes. For a complete explanation of resource requirement expressions, see `lsfintro(1)`. To find out what resources are configured in your system, use `lsinfo(1)` and `lshosts(1)`.

LSF supports ordering of resource requirements on all load indices, including external load indices, either static or dynamic.

Exclusive resources need to be explicitly specified within the resource requirement string. For example, you defined a resource called `bigmem` in `lsf.shared` and defined it as an exclusive resource for `hostE` in `lsf.cluster.mycluster`. Use the following command to submit a task to run on `hostE`:

```
lsrun -R "bigmem" myjob
```

or

```
lsrun -R "defined(bigmem)" myjob
```

If the `-m` option is specified with a single host name, the `-R` option is ignored.

- h** Prints command usage to `stderr` and exits.
- v** Prints LSF release version to `stderr` and exits.

## Usage

You can use `lsrun` together with other utility commands such as `lsplace(1)`, `lsload(1)`, `lsloadadj(1)`, and `lseligible(1)` to write load sharing applications in the form of UNIX shell scripts.

`lsrun` supports interactive job control. Suspending `lsrun` suspends both the task and `lsrun`, and continuing `lsrun` continues the task.

If `LSB_DISABLE_LIMLOCK_EXCL=y` (to enable preemption of exclusive jobs, for example), you can use `lsrun` to start a task on a host that is currently running an exclusive job.

The `-n` option of `rsh(1)` can be simulated by redirecting input from `/dev/null`. For example:

```
lsrun cat </dev/null &
```

## Diagnostics

`lsrun` exits with status `-10` and prints an error message to `stderr` if a problem is detected in LSF and the task is not run.

The exit status is `-1` and an error message is printed to `stderr` if a system call fails or incorrect arguments are specified.

Otherwise, the exit status is the exit status of the task.

## See Also

`rsh`, `lsfintro`, `ls_rexecv`, [lsplace](#), [lseligible](#), [lsload](#), [lshosts](#), [lsrtasks](#), `lsf.cluster`

# Istcsh

load sharing *tcsh* for LSF

## Synopsis

```
lstcsh [tcsh_options] [-L] [argument ...]
```

## Description

*lstcsh* is an enhanced version of *tcsh*. *lstcsh* behaves exactly like *tcsh*, except that it includes a load sharing capability with transparent remote job execution for LSF.

By default, a *lstcsh* script is executed as a normal *tcsh* script with load sharing disabled.

If a command line is considered eligible for remote execution, LSF selects a suitable host— typically a powerful and/or lightly loaded host that can execute the command line correctly—and sends the command line to that host.

You can restrict who can use @ for host redirection in *lstcsh* with the parameter `LSF_SHELL_AT_USERS` in `lsf.conf`.

## Remote Hosts

*lstcsh* provides a high degree of network transparency. Command lines executed on remote hosts behave the same as they do on the local host. The remote execution environment is designed to mirror the local one as closely as possible by using the same values for environment variables, terminal setup, current working directory, file creation mask, and so on. Each modification to the local set of environment variables is automatically reflected on remote hosts.

Shell variables, nice values, and resource limits are not automatically propagated to remote hosts.

## Job Control

Job control in *lstcsh* is exactly the same as in *tcsh* except for remote background jobs. *lstcsh* numbers background jobs separately for each of the hosts that are used to execute them. The output of the built-in command `job` lists background jobs together with their execution hosts.

To bring a remote background job to the foreground, the host name must be specified together with an at sign (@), as in the following example:

```
fg %2 @hostA
```

Similarly, the host name must be specified when killing a remote job. For example:

```
kill %2 @hostA
```

## Options

***tcsh\_options*** *lstcsh* accepts all the options used by *tcsh*. See *tcsh(1)* for the meaning of specific options.

- L Executes a script with load sharing enabled.

There are three ways to run a `lstcsh` script with load sharing enabled:

- Execute the script with the `-L` option
- Use the built-in command `source` to execute the script
- Insert `#!/local/bin/lstcsh -L` as the first line of the script (assuming you install `lstcsh` in `/local/bin`).

Using `@` or `lsmode` in a script will not enable load sharing if the script has not been executed using one of these three ways.

## Usage

In addition to the built-in commands in `tcsh`, `lstcsh` provides the following built-in commands:

```
lsmode [on | off] [local | remote] [@] [v | -v] [e | -e] [t | -t] [connect
[host_name ...]] [lsrtasks [lsrtasks_options]] [lsltasks [lsltasks_options]] [jobs]
```

**on | off** Turns load sharing on or off. When off, you can specify `@` to send a command line to a remote host.

**local | remote** Sets operation mode of `lstcsh`.

The default is `local`.

### local

Local operation mode. This is the default mode.

In this mode, a command line is eligible for remote execution only if all the specified tasks are present in the remote task list in the user's tasks file `$HOME/.lsftask`, or if `@` is specified on the command line to force specified tasks to be eligible for remote execution.

Tasks in the local task list must be executed locally.

The local mode of operation is conservative, and can fail to take advantage of the performance benefits and load balancing advantages of LSF.

The way `lstcsh` handles tasks that are not present in the remote task list nor in the local task list, depends on the mode of operation of `lstcsh` (local or remote).

### remote

Remote operation mode.

In this mode, a command line is considered eligible for remote execution only if none of the specified tasks are present in the local task list in the user's tasks file `$HOME/.lsftask`.

Tasks in the remote list can be executed remotely.

The remote mode of operation is aggressive, and promotes extensive use of LSF.

The way `lstcsh` handles tasks that are not present in the remote task list nor in the local task list, depends on the mode of operation of `lstcsh` (local or remote).

**@** Specify `@` to explicitly specify the eligibility of a command for remote execution.

The `@` may be anywhere in the command line except in the first position (which is used to set the value of shell variables).

There are several ways to use `@`:

**@** : Specify @ followed by nothing to indicate the command line is eligible for remote execution.

**@ host\_name** : Specify @ followed by a host name to force the command line to be executed on that host.

Host names and the reserved word `local` following @ can all be abbreviated as long as they do not cause ambiguity.

**@ local** : Specify @ followed by the reserved word `local` to force the command line to be executed on the local host.

**@ /res\_req** : Specify @ followed by / and a resource requirement string to indicate the command is eligible for remote execution, and that the specified resource requirements must be used instead of those in the remote task list.

When specifying resource requirements following the @ it is necessary to use / only if the first requirement characters specified are also the first characters of a host name.

**e | -e** Turns eligibility verbose mode on (e) or off (-e).

If eligibility verbose mode is on, `lscsh` shows whether the command is eligible for remote execution, and displays the resource requirement used if the command is eligible.

The default is off.

**v | -v** Turns task placement verbose mode on (v) or off (-v). If verbose mode is on, `lscsh` displays the name of the host on which the command is run if the command is not run on the local host.

The default is on.

**t | -t** Turns wall clock timing on (t) or off (-t).

If timing is on, the actual response time of the command is displayed. This is the total elapsed time in seconds from the time you submit the command to the time the prompt comes back.

This time includes all remote execution overhead. The `csch` time built-in does not include the remote execution overhead.

This is an impartial way of comparing the response time of jobs submitted locally or remotely, because all the load sharing overhead is included in the displayed elapsed time.

The default is off.

### **connect [host\_name ...]**

Establishes connections with specified remote hosts. If no hosts are specified, lists all the remote hosts to which an `lscsh` connection has been established.

A plus sign (+) with a remote host indicates that a server-shell has also been started on it.

### **lsrtasks [+ task\_name[/res\_req ...] | - task\_name[/res\_req ...]]**

Displays or update a user's remote task list in the user's task list `$HOME/.lscftask`.

## Files

This command has the same function as the external command `lsrtasks`, except that the modified remote task list takes effect immediately for the current `lscsh` session.

See `lsrtasks(1)` for more details.

### **lsltasks** [+ *task\_name* ...] [- *task\_name* ...]

Displays or update a user's local task list in the user's task list `$HOME/.lsftask`.

This command has the same function as the external command `lsltasks`, except that the modified local task list takes effect immediately for the current `lscsh` session.

See `lsltasks(1)` for more details.

**jobs** Lists background jobs together with the execution hosts. This break of transparency is intentional in order to provide you with more control over your background jobs.

## Files

There are three optional configuration files for `lscsh`:

`.shrc`  
`.hostrc`  
`.lsftask`

The `.shrc` and `.hostrc` files are used by `lscsh` alone, whereas `.lsftask` is used by LSF to determine general task eligibility.

### ~/.shrc

Use this file when you want an execution environment on remote hosts that is different from that on the local host. This file is sourced automatically on a remote host when a connection is established. For example, if the remote host is of different type, you may need to run a version of the executable for that particular host type, therefore it may be necessary to set a different path on the remote host.

### ~/.hostrc

Use this file to indicate a list of host names to which the user wants to be connected (asynchronously in the background) at `lscsh` startup time. This saves the time spent in establishing the connections dynamically during execution of shell commands. Once a connection is set up, you can execute further remote commands on those connected hosts with very little overhead.

### ~/.lsftask

Use this file to specify lists of remote and local tasks that you want to be added to the respective system default lists. Each line of this file is of the form `task_name/res_req`, where `task_name` is the name of a task, and `res_req` is a string specifying the resource requirements of the task. If `res_req` is not specified, the command is executed on machines of the same type as the local host.

## Limitations

Type-ahead for the `next` command is discarded when a job is executing in the foreground on a remote host.

It is not possible to provide input data to load sharing shell scripts (that is, shell scripts whose content is load shared).

The `lscsh` is fully compatible with `tcsh` 6.03 7-bit mode. Any feature that is not included in `tcsh` 6.03 is not supported.

## See Also

[csh\(1\)](#), [tcsh\(1\)](#), [lsrtasks\(1\)](#), [lsltasks\(1\)](#), [lselectible\(1\)](#), [lsinfo\(1\)](#), [lsload\(1\)](#)

# pam

Parallel Application Manager – job starter for MPI applications

## Synopsis

### HP-UX vendor MPI syntax

```
bsub pam -mpi mpirun [mpirun_options] mpi_app [argument ...]
```

### SGI vendor MPI syntax

```
bsub pam [-n num_tasks] -mpi -auto_place mpi_app [argument ...]
```

### Generic PJJ framework syntax

```
bsub pam [-t] [-v] [-n num_tasks] -g [num_args]
    pjl_wrapper [pjl_options] mpi_app [argument ...]
pam [-h] [-V]
```

## Description

The Parallel Application Manager (PAM) is the point of control for Platform LSF. PAM is fully integrated with Platform LSF to interface the user application with LSF. PAM acts as the supervisor of a parallel LSF job.

MPI jobs started by `pam` can only be submitted through the LSF Batch system. PAM cannot be used interactively to start parallel jobs. `sbatchd` starts PAM on the first execution host.

For all parallel application processes (tasks), PAM:

- ◆ Uses a vendor MPI library or an MPI Parallel Job Launcher (PJJ; for example, `mpirun`, `poe`) to start a parallel job on a specified set of hosts in a LSF cluster.
- ◆ PAM contacts RES on each execution host allocated to the parallel job.
- ◆ PAM queries RES periodically to collect resource usage for each parallel task and passes control signals through RES to all process groups and individual running tasks, and cleans up tasks as needed.
- ◆ Passes job-level resource usage and process IDs (PIDs and PGIDs) to `sbatchd` for enforcement
- ◆ Collects resource usage information and exit status upon termination

### Task startup for vendor MPI jobs

The `pam` command starts a vendor MPI job on a specified set of hosts in a LSF cluster. Using `pam` to start an MPI job requires the underlying MPI system to be LSF aware, using a vendor MPI implementation that supports LSF (SGI IRIX vendor MPI or HP-UX vendor MPI).

PAM uses the vendor MPI library to spawn the child processes needed for the parallel tasks that make up your MPI application. It starts these tasks on the systems allocated by LSF. The allocation includes the number of execution hosts needed, and the number of child processes needed on each host.

## Task startup for LSF HPC generic PjL jobs

For parallel jobs submitted with `bsub`:

- ◆ PAM invokes the PjL, which in turn invokes the TaskStarter (TS).
- ◆ TS starts the tasks on each execution host, reports the process ID to PAM, and waits for the task to finish.

## Options

### Options for vendor MPI jobs

**-auto\_place** The `-auto_place` option on the `pam` command line tells the SGI IRIX `mpirun` library to launch the MPI application according to the resources allocated by LSF.

**-mpi** In the SGI environment, the `-mpi` option on the `bsub` and `pam` command line is equivalent to the `mpirun` command.

On HP-UX, you can have LSF manage the allocation of hosts to achieve better resource utilization by coordinating the start-up phase with `mpirun`. This is done by preceding the regular HP MPI `mpirun` command with:

```
bsub pam -mpi
```

For HP-UX vendor MPI jobs, the `-mpi` option must be the first option of the `pam` command.

For example, to run a single-host job and have LSF select the host, the command:

```
mpirun -np 14 a.out
```

is entered as:

```
bsub pam -mpi mpirun -np 14 a.out
```

**-n num\_tasks** The number of processors required to run the MPI application, typically the number of parallel tasks in the job. If the host is a multiprocessor, one host can start several tasks.

You can use both `bsub -n` and `pam -n` in the same job submission. The number specified in the `pam -n` option should be less than or equal to the number specified by `bsub -n`. If the number of tasks specified with `pam -n` is greater than the number specified by `bsub -n`, the `pam -n` is ignored.

For example, on SGI IRIX or SGI Altix, you can specify:

```
bsub -n 5 pam -n 2 -mpi -auto_place a.out
```

Here, the job requests 5 processors, but PAM only starts 2 parallel tasks.

### ***mpi\_app*** [*argument ...*]

The name of the MPI application to be run on the listed hosts. This must be the last argument on the command line.

**-h** Prints command usage to `stderr` and exit.

**-v** Prints LSF release version to `stderr` and exit.

## Options for LSF HPC generic PJI jobs

- t** This option tells `pam` not to print out the MPI job tasks summary report to the standard output. By default, the summary report prints out the task ID, the host on which it was executed, the command that was executed, the exit status, and the termination time.
- v** Verbose mode. Displays the name of the execution host or hosts.

### **-g** [*num\_args*] *pjl\_wrapper* [*pjl\_options*]

The `-g` option is required to use the LSF generic PJI framework. You must specify all the other `pam` options before `-g`.

*num\_args*

Specifies how many space-separated arguments in the command line are related to the PJI (after that, the remaining section of the command line is assumed to be related to the binary application that launches the parallel tasks).

*pjl\_wrapper*

The name of the PJI

*pjl\_options*

Optional arguments to the PJI

For example:

- ◆ A PJI named `no_arg_pjl` takes no options, so *num\_args*=1. The syntax is:

```
pam [pam_options] -g 1 no_arg_pjl job [job_options]
```

- ◆ A PJI is named `3_arg_pjl` and takes the options `-a`, `-b`, and `group_name`, so *num\_args*=4. The syntax is:

```
pam [pam_options] -g 4 3_arg_pjl -a -b group_name job [job_options]
```

- n** *num\_tasks* The number of processors required to run the MPI application, typically the number of parallel tasks in the job. If the host is a multiprocessor, one host can start several tasks.

You can use both `bsub -n` and `pam -n` in the same job submission. The number specified in the `pam -n` option should be less than or equal to the number specified by `bsub -n`. If the number of tasks specified with `pam -n` is greater than the number specified by `bsub -n`, the `pam -n` is ignored.

### **mpi\_app** [*argument ...*]

The name of the MPI application to be run on the listed hosts. This must be the last argument on the command line.

- h** Prints command usage to `stderr` and exit.
- V** Prints LSF release version to `stderr` and exit.

## Exit Status

`pam` exits with the exit status of `mpirun` or the PJI wrapper.

## See Also

[bsub\(1\)](#)

# patchinstall

UNIX only. Manage patches in a licensed Platform cluster.

## Synopsis

```
patchinstall [-f env_file] [--silent] package...  
patchinstall -c [-f env_file] [--silent] package...  
patchinstall -r [-f env_file] [--silent] package  
patchinstall -r [-f env_file] [--silent] build_number  
patchinstall -h
```

## Description

Permission required to run this command depends on the package contents and the original cluster installation account; you should normally log on as root, but you can patch some binaries as cluster administrator (`lsfadmin`).

By default, the command installs one or more packages in an existing cluster.

The cluster location is normally determined by your environment setting, so ensure your environment is set before you run this command (for example, you sourced `cshrc.lsf` or `profile.lsf`).

Specify the packages you want to install.

The installer does some checking first. If it does not find a problem, it prompts you to proceed with installation. If you confirm, it backs up the current binaries to the patch backup directory and then installs the specified packages on the cluster, updating or adding new binaries. It does not modify any existing configuration files. If there is any problem during installation of a package, it automatically rolls back to the cluster's previous state. It records the changes in the patch history directory. This additional checking can take more time than installing with `lsfinstall`.

The command can also be used to do the following:

- ◆ Check—do the checking for the packages without installing them. For more information, see the `-c` option.
- ◆ Roll back—remove the most recent patch and return the cluster to the previous patch level. If you want to roll back multiple versions, you must roll back one patch level at a time, in the reverse order of installation. For more information, see the `-r` option.

## Options

- c** Check. Perform checking as if to install, but do not proceed with installation. Specify each package you want to check. You may specify multiple packages. Checks that the existing cluster is compatible with the patch (the same version of the product is already installed on the same binary types). Fixes and fix packs may also require that a specific enhancement pack be installed.

## Output

Checks that your user account has permission to write to the installation directory, backup directory, and history directory.

Lists existing files that will be overwritten by the patch.

Lists files that will be added by the patch.

**-f *env\_file*** This option should only be used if you cannot set your environment (for example, you cannot source `cshrc.lsf` or `profile.lsf`).

Specify the full path and file name of a file (such as your LSF `install.config` file) that properly defines the parameter `LSF_TOP`.

If you use this option, the command gets the cluster location from this file, not from the settings in your environment.

**-h** Outputs command usage and exits.

**-r** Rollback. You must specify the most recently installed patch. The installer checks all binary types and finds all instances where the most recently installed patch has the same build number. These packages are removed and the cluster reverts to the previous patch level.

Specify the build number of the most recent patch or specify full path to the package you used to install the most recent patch. The installer will automatically check the package to determine the build. You cannot specify any other build.

To remove multiple patches and roll back multiple versions, you must run the command multiple times and roll back one patch level at a time.

You cannot roll back if the backup files from the previous patch level are unavailable (if you deleted them from the patch backup directory).

**--silent** Silent mode. Install or roll back without any interactive prompts for confirmation.

## Output

Status information and prompts are displayed in your command console.

Status information is also logged to `patch.log` (when patching or rolling back the cluster) or `precheck.log` (when checking a package).

If there are any problems found when checking a package, errors are displayed in your command console and also logged to `patch.err`.

## See Also

- ◆ `pversions` command: displays the patch level of products installed in your cluster
- ◆ `install.config` file: describes the parameter `LSF_TOP`
- ◆ `patch.conf` file: defines backup and history directories

# pversions (Windows)

Windows version of the command: displays the version information for Platform products installed on a Windows host.

## Synopsis

```
pversions [product_name]  
pversions -h  
pversions -V
```

## Description

Displays the version and patch level of a Platform product installed on a Windows host, and the list of patches installed.

## Options

- product\_name*** Specify the Platform product for which you want version information. Specify one of the following:
- ◆ EGO—to see version information for Platform EGO
  - ◆ Symphony—to see version information for Platform Symphony and Symphony Developer's Edition
  - ◆ LSF—to see version information for Platform LSF
- h** Prints command usage to `stderr` and exits from the software.
- v** Prints product version to `stderr` and exits.

# pversions (UNIX)

UNIX version of the command: displays the version information for Platform products installed on UNIX hosts.

## Synopsis

```
pversions [-f env_file] [-p product_name]
pversions [-f env_file] -b build_number
pversions [-f env_file] -q file_name
pversions -c package_name
pversions -h
```

## Description

By default, displays the version and patch level of Platform products.

The cluster location is normally determined by your environment setting, so ensure your environment is set before you run this command (for example, you sourced `cshrc.lsf` or `profile.lsf`).

For each binary type, displays basic version information (package build date, build number, package installed date) and lists patches installed (package type, build number, date installed, fixes).

Optionally, the command can also be used to do the following:

- ◆ Check the contents of a package before installing it
- ◆ Show information about a specific Platform product installed
- ◆ Show information about installed packages from specific build
- ◆ Find current versions of a specific Platform file and see information for each

## Options

**-f *env\_file*** This option should only be used if you cannot set your environment (for example, you cannot source `cshrc.lsf` or `profile.lsf`).

Specify the full path and file name of a file (such as your LSF `install.config` file) that properly defines the parameter `LSF_TOP`.

If you use this option, the command gets the cluster location from this file, not from the settings in your environment.

**-b *build\_number*** Specify the build number of an installed patch (you can specify the most recent full installation or patches installed after the most recent full installation).

Displays information and the contents of the build (binary type and install date, notes, fixes, and files in the package).

**-c *package\_name*** Specify the full path and file name of an uninstalled package. For this option, you do not need to set your environment because a cluster is not required.

Displays package contents (notes, fixes, and files in the patch).

**-p *product\_name*** Specify one Platform product to see information for that product only. Specify LSF to see information about LSF or PMC to see information about the Console package.

- q file\_name** Specify the file name of one installed file.  
For each binary type, displays basic version information and file location. If the binary has been updated after the most recent full installation, displays additional information about the most recent patch that updated the file (build number, fixes, notes, date installed)
- h** Outputs command usage and exits.

## Output

Information is displayed in your command console.

### Product Version Information (Default and -p)

By default, displays product information for entire cluster. With `-p`, displays information for specified product only.

For each Platform product, displays product name and version followed by specific information about each binary type.

For each binary type, displays basic version information (package build date, build number, package installed date) and lists any patches installed (package type, build number or fix number, date installed).

#### binary type

Binary type, build number of binary, and build date of the binary for the most recent full installation (a full installation is installation of any distribution that contains a complete set of new binaries. A full installation can be a new cluster, a licensed upgrade, or patching with an enhancement pack).

#### installed

Date the binary was installed for the most recent full installation.

#### patched

For each patch after the most recent full installation, displays fix number, build number, and date patch was installed. If the patch was a fix pack, multiple fixes are listed.

### File Version Information (-q)

With `-q`, displays information for specified file only.

For each Platform product that contains the specified file, displays product name and version followed by specific information about each binary type.

For each binary type that contains the specified file, displays basic version information and file location. If the binary has been updated after the most recent full installation, displays additional information about the most recent patch that updated the file (build number, fixes, notes, date installed).

#### binary type

Binary type, build number of binary, and build date of the binary for the most recent full installation (a full installation is any distribution that contains a complete set of new binaries. A full installation can be a new cluster installation, a licensed version upgrade, or patching with an enhancement pack).

#### installed

Date the binary was installed for the most recent full installation.

#### file

Full path to the version of the file being used for this binary type.

## Output

### last patched

For the last patch to update the file after the most recent full installation, displays build number and date patch was installed.

### last patch notes

Optional. Some information provided by Platform for the last patch that updated the file.

### last patch fixes

Fixes included in the last patch that updated the file.

## Build Version Information (-b)

With -b, displays information for patches with the specified build number only.

For each Platform product, if the product is using binaries from the specified build, displays product name and version followed by specific information about each binary type.

For each binary type, displays the following:

### binary type

Binary type, build number and build date of the patch.

### installed

Date the patch was installed.

### notes

Optional. Some information provided by Platform for the build.

### fixes

Fixes included in the patch.

### files

Files included in the patch (not shown for a full distribution such as enhancement pack). Full path to the file installed by this patch.

## Package Version Information (-c)

With -c, displays version information for a specified uninstalled package.

### product

Displays Platform product name and version.

### binary type

Binary type, build number and build date of the patch.

### notes

Optional. Some information provided by Platform for the build.

### fixes

Fixes included in the patch.

### files

Files included in the patch (not shown for a full distribution such as enhancement pack). Relative path to the file.

# taskman

checks out a license token and manages interactive UNIX applications

## Synopsis

```
taskman -Lp project
        -R "rusage[token=number[:duration=minutes | hoursh]
          [:token=number[:duration=minutes | hoursh]]...] [-N n_retries]
          [-v] command

taskman [-h | -V]
```

## Description

Runs the interactive UNIX application on behalf of the user. When it starts, the task manager connects to License Scheduler to request the application license tokens. When all the requested licenses are available, the task manager starts the application. While the application is running, the task manager monitors resource usage, CPU, and memory, and reports the usage to License Scheduler. When the application terminates, the task manager exits.

By default, a license is reserved for the duration of the task, so the application can check out the license at any time. Use the `duration` keyword if you want unused licenses to be reallocated if the application fails to check out the license before the reservation expires.

## Options

- `command`** Required. The command to start the job that requires the license.
- `-v`** Verbose mode. Displays detailed messages about the status of configuration files.
- `-N n_retries`** Specifies the maximum number of retry attempts taskman will take to connect to the daemon. If this option is not specified, taskman will retry indefinitely.
- `-Lp project`** Required. Specifies the interactive license project that is requesting tokens. The client must be known to LSF License Scheduler.
- `-R "rusage[token=number[:duration=minutes | hoursh]][:token=number[:duration=minutes | hoursh]]..."`** Required. Specifies the type and number of license tokens to request from GLB. Optionally, specifies a time limit for the license reservation, expressed as an integer (the keyword `h` following the number indicates hours instead of minutes). You may specify multiple license types, with different duration values. Separate each requirement with a colon (:). Enclose the entire list in one set of square brackets.
- `-h`** Prints command usage to `stderr` and exits.
- `-V`** Prints the License Scheduler release version to `stderr` and exits.

# tspeek

displays the `stdout` and `stderr` output of an unfinished Terminal Services job

## Synopsis

```
tspeek job_ID  
tspeek [-h | -V]
```

## Description

Displays the standard output and standard error output that have been produced by one of your unfinished Terminal Services jobs, up to the time that this command is invoked.

This command is useful for monitoring the progress of a job and identifying errors. If errors are observed, valuable user time and system resources can be saved by terminating an erroneous job.

`tspeek` is supported on Windows and Linux. You cannot use `tspeek` to monitor job output from UNIX. `tspeek` on Linux requires `rdesktop`.

You can use `tspeek` from any Linux host where `rdesktop` is installed to view the output of a Terminal Services job. For example, if your job ID is 23245, run:

```
tspeek 23245
```

## Options

- job\_ID*** Operates on the specified Terminal Services job.
- h** Prints command usage to `stderr` and exits.
- V** Prints LSF release version to `stderr` and exits.

## See Also

[tssub](#)

# tssub

submits a Terminal Services job to LSF

## Synopsis

```
tssub [bsub_options] command [arguments]  
tssub [-h | -V]
```

## Description

Submits a Terminal Services job for batch execution and assigns it a unique numerical job ID.

`tssub` is a wrapper around the `bsub` command which only submits jobs to hosts that have Microsoft Terminal Services installed. For `bsub` options, see the [bsub](#) command.

You submit Terminal Services job with `tssub` instead of `bsub`. If the terminal window is closed, the job will remain running. You can reconnect to view the job with `tspeek`.

`tssub` is supported on Windows and Linux. You cannot use `tssub` to submit Terminal Services jobs from UNIX.

If the job is dispatched to a host in which Terminal Services is not installed or properly configured, the job is set to the PEND state and a pending reason is written in `sbatchd.log.host_name`.

If `tssub -I` is specified, a terminal display is visible on the submission host after the job has been started.

If the job is not a GUI job, LSF runs a command window and output is displayed in the command window when something is written to `stdout`.

Pre- and post-execution commands are executed within the terminal session. The job does not complete until post-execution commands complete.

If you use `bjobs -l` to monitor the job, you will see a message similar to “External Message 2 was posted from LSF\lsfadmin to message box 2”. The body of the message contains the ID of the terminal session that was created.

Use [tspeek](#) to view job output.

`tssub` sets the `LSB_TSJOB` and `LSF_LOGON_DESKTOP` environment variables. These variables are then transferred to the execution host:

### **LSF\_LOGON\_DESKTOP**

When `LSF_LOGON_DESKTOP=1`, jobs run in interactive foreground sessions. This allows GUIs to be displayed on the execution host. If this parameter is not defined, jobs run in the background.

### **LSB\_TSJOB**

When the `LSB_TSJOB` variable is defined to any value, it indicates to LSF that the job is a Terminal Services job.

## Limitations

- ◆ You cannot use `bmod` to modify a job submitted as a Terminal Services job to become a non-Terminal Services job
- ◆ The `bsub` option `-o out_file` is not supported for `tssub`
- ◆ Only Windows `bsub` options are supported for `tssub`. For example, you cannot use the options `-Ip`, `-Is`, `-L login_shell` of `bsub` with `tssub`.
- ◆ Interactive `bsub` options (`-I`, `-Ip`, `-Is`) are not supported with `tssub` on Linux
- ◆ If user mapping is defined, the user who invokes `tspeek` must have the required privileges to access the session
- ◆ MultiCluster is not supported

## Options

***bsub\_options*** Only Windows `bsub` options are supported for `tssub`. For example, you cannot use the options `-Ip`, `-Is`, `-L login_shell` of `bsub` with `tssub`.

For `bsub` options, see the [bsub](#) command.

***command [argument]*** The job can be specified by a command line argument `command`, or through the standard input if the command is not present on the command line. The *command* is assumed to begin with the first word that is not part of a `tssub` option. All arguments that follow *command* are provided as the arguments to the *command*.

The job command can be up to 4094 characters long for UNIX and Linux or up to 255 characters for Windows. If no job name is specified with `-J`, `bjobs`, `bhist` and `bacct` displays the command as the job name.

The commands are executed in the order in which they are given.

- h** Prints command usage to `stderr` and exits.
- v** Prints LSF release version to `stderr` and exits.

## See Also

[bsub](#), [tspeek](#)

# wgpasswd

changes a user's password for an entire Microsoft Windows workgroup

## Synopsis

```
wgpasswd [user_name]
```

```
wgpasswd [-h]
```

## Description

You must run this command on a host in a Windows workgroup. You must have administrative privileges to change another user's password.

Prompts for old and new passwords, then changes the password on every host in the workgroup.

By default, modifies your own user account.

## Options

***user\_name*** Specifies the account to modify. You must have administrative privileges to change another user's password.

**-h** Prints command usage to `stderr` and exits.

## Output

For each host in the workgroup, returns the status of the operation (SUCCESS or FAILED).

## Files

Modifies the LSF password file.

wguser

# wguser

modifies user accounts for an entire Microsoft Windows workgroup

## Synopsis

```
wguser [-r] user_name ...
```

```
wguser [-h]
```

## Description

---

**CAUTION:** You must run this command on a host in a Microsoft Windows workgroup. You should have administrative privileges on every host in the workgroup.

---

Modifies accounts on every host in the workgroup that you have administrative privileges on.

By default, prompts for a default password to use for all of the accounts, and then creates the specified user accounts on each host, if they do not already exist.

Use `-r` to remove accounts from the workgroup.

## Options

- r** Removes the specified user accounts from each host, if they exist.
- user\_name* ...** Required. Specifies the accounts to add or remove.
- h** Prints command usage to `stderr` and exits.

## Output

For each host in the workgroup, returns the result of the operation (SUCCESS or FAILED).

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